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ABSTRACT

In 1961, administrative personnel at Delhi College in New York observed that formal training programs for animal science technicians were virtually nonexistant. Response to this apparent need resulted in the initiation of perhaps the first 2-year Animal Science Technology Program in the nation. This two-volume report is the result of an extensive evaluation of the program's development and content. Major sections of this volume are: (1) Introduction, (2) Development of the Animal Science Technology Program at Delhi, (3) Facilities, Equipment and Special Instructional Materials, (4) The Curriculum, (5) Economic-Cost Considerations, (6) Importance of the Study, and (7) Summary, Conclusions, Implications and Recommendations. Included in the appendixes are sample evaluation instruments and statistical data on the followup study. A major finding of the report is that both employers and employees reflected favorably upon the skills and abilities gained in the primary areas of training. Volume II of this report, which contains the curriculum course outlines, is available as VT 013 805. (Author/JS)

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ANIMAL SCIENCE TECHNOLOGY

AN EXPERIMENTAL DEVELOPMENTAL PROGRAM

VOLUME I

REPORT OF THE DEVELOPMENTAL PROGRAM

This program of development in the field of Animal Science Technology was completed by the State University of New York Agricultural and Technical College at Delhi, New York, pursuant to Contract No. OE-5-85-076 with the Office of Education.

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ABSTRACT

Extension development and diversified growth in the biomedical research and veterinary medical fields during the past twenty-five years has created a continuously expanding requirement for the services of technically trained, career oriented, paraprofessional personnel. Both the research investigator, and veterinary practitioner, along with other professionals in technical areas proximal to the Animal Science field have become increasingly dependent upon the abilities and services of qualified technicians to work in support of the professional scientist and/or veterinarian.

Until a decade ago, formal training programs at the college and university level designed to qualify personnel for entry into the animal technician employment field were virtually non existant. Proficiencies concomitant with this occupational area were usually gained as a result of on the job training exercises completed in the research laboratory or at the veterinary hospital.

In 1961, administrative personnel at Delhi College, astutely observed that formal training opportunities for individuals in this expanding career area were in a "long overdue" status. Response to this need resulted in the initiation of perhaps the first, two year Animal Science Technology, AAS Degree program, in the nation.

This program which started in 1961 with a total of eight students was designed to provide training in a "cluster" of occupational areas adjacent to the animal science field.

During the first three years of operation enrollment in this curriculum increased to 49 participants. Although program growth was in evidence, essential changes which were needed to improve and strengthen the beginning curriculum (replacement of agricultural emphasis courses with animal science technical courses) was not possible due to the inavailability of staff, facilities and fiscal support.

In 1965, the resources necessary to initiate desired changes in the program were provided by a contract award from the United States Office of Education. This four and a half year contract made available the staffing, equipment and supplies plus ancillary services and provisions needed to develop the full curricular potential and instructional effectiveness of the program. As shown in (Table I, Page 27) a total of $139,200 was budgeted for this purpose between 1965 and the end of 1969. Simultaneously, support from New York State, primarily for personnel, instructional facilities and supplies, amounted to $601,329 during that period. Additional supplemental funding in the form of Federal and State - Federal matching equipment grants awarded between 1966-1969 totaled more than $140,000.

Enumerated on a chronological basis the most significant changes which occurred from the inception of the program in 1961, to the present, particularly since 1965, are as follows:

a. The professional staff was increased from one instructor (a licensed veterinarian) in 1961, to three veterinarians, a laboratory animal scientist and two technical assistants in 1961.

b. The organizing in 1964, of an Animal Science Advisory Committee (see Chapter II, Page 67) composed of professional representatives from the Animal Science occupational field was particularly significant in view of the guidance and advisement provided in the developmental period between 1965 and the present.

c. The curriculum underwent four major modifications (see Curricular Models I - IV, pages 51 - 54) during that period. Fundamental changes included deletion of most of the agriculturally-oriented courses, which were present in the beginning program and inserting Animal Science specialty courses in their place. A final alteration which occurred in 1969, included the establishment of a two option curriculum; namely, the Laboratory Animal Science and Veterinary Assistant options.

d. The instructional program was improved significantly when, in addition to increased staffing, the Animal Science Center became available in 1966. Specialized equipment and other supplements to instruction present in this facility enabled a highly conceptualized approach to the development of technical proficiencies, by the student.

e. Professional evaluation of the program, made possible by funds from the federal contract, provided continuous "input" from graduates and employers regarding curricular and training effectiveness. Several curricular changes and alterations of individual courses, resulting from the availability of this type of data.

f. Services and resources available to students at this College also increased appreciably during the developmental period. Academic counseling, guidance and career planning advisement specialists were added to the College staff. A library, instructional complex constructed in 1966, expanded the academic resources available to the student. Housing and health services were also improved during this period.

By the end of 1969, significant progress toward achieving the developmental objectives planned for the Animal Science Program had been made. Support provided by the Federal government and the State of New York had enabled the addition of qualified professional staff, the attainment of well equipped instructional facilities and the upgrading and enhancement of the technical curriculum and instructional program.

Data from the final, program evaluation report alludes to the effectiveness of the Animal Science graduate under occupational conditions as follows:

a. Employees (graduates) and employers reflected favorably upon the skills and abilities gained in the primary areas of training.

b. Employers of graduates considered 83% of them "well qualified" for their present positions. The remaining 17% were rated "qualified".

A TWO-YEAR A.A.S. DEGREE DEVELOPMENTAL PROGRAM IN ANIMAL SCIENCE TECHNOLOGY

CHAPTER I

INTRODUCTION

Need For A Program In Animal Science Technology

During the past twenty-five years, since the end of World War II, widely diversified programs in the fields of biomedical and veterinary research have evolved and expanded to enormous size and complexity in governmental, private and commercial laboratories across the nation.

Simultaneously, and as a direct result of this development, the medical, veterinary and related professions have had at their disposal, on an increasing basis, the products and discoveries emanating from the research sector. The availability of vaccines, antibiotics and varieties of other therapeutic compounds, along with highly sensitive instrumentation and continuous advances in clinical and surgical techniques, have virtually revolutionized the approaches to/and practice of, human and veterinary medicine in recent years. Also present, as part of the "changing scene," is the continually accelerating requirement for para-professional personnel in the animal sciences, comprehensively trained in the skills and techniques required to support and complement the work of the research investigator and the practicing veterinarian. As the technology associated with these professional areas grows in scope and complexity, the need for competent animal technicians and technologists increases proportionately. In recognizing the dependency being placed on this career classification at present, it is significant, perhaps even ironic, to point out that until the past decade, educational programs at the college and university level designed to prepare animal technicians were virtually non-existent. Only within the past five years have any significant developments been forthcoming which provide for and facilitate the college training of laboratory animal research technicians and veterinary assistant personnel. Currently, even with several educational institutions offering programs of this type, relatively few students have been graduated; thus the need for individuals with proficiencies of this type continues at the acute level.

Justification And Purpose Of The Program

Evidence attesting to the deficiency of formally trained animal technicians is readily observable in the biomedical research laboratories and veterinary hospital practices across the nation. Currently, animal support personnel that are being employed in either of these career areas usually can be classified into two categories, both of which demonstrate the need presently existing for personnel with training in the animal technology specialty. The first is the unskilled individual who, through a conceptual approach including observation and work experience, is trained on the job. Frequently this type of preparation exposes the candidate to a prolonged apprenticeship at a level which does little to educate, motivate or challenge. The resultant product of this method of training is often "trapped" in a position at a sub-technical level. The second category includes the individual with proficiencies in skill areas which are proximal to the animal technician; perhaps the liberal arts graduate in the biological sciences, the registered nurse or medical technician. It is unlikely that the training received in these quasi-career areas involved much, if any, orientation in animal technology which could be applied in a working situation. Therefore, the individual in this classification would also be required to undergo a period of instruction on the job which could involve months of training in animal technology, before proficiencies would be satisfactorily developed.

In the context of current and projected demands for personnel trained specifically in the field of animal science technology, the practices (just reviewed) which are utilized at present within the research community and veterinary profession will be largely inadequate in supplying the numbers of competent animal technicians needed with skills and techniques already developed, to complement the work of the research investigator and veterinary practitioner.

To validate these conclusions as they relate to the research field, reference is hereby made to the most up-to-date national survey which was conducted by the Institute of Laboratory Animal Resources in 1968.[1] With

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[1] Laboratory Animal Care Vol. 20, No. 4, Part II August, 1970.

75-80% of the national community responding, it was reported that from a biomedical research budget of $920 million in fiscal year 1967, approximately $408 million was spent for research in which animals were used. Of that total, more than $50 million was spent by the survey respondents for the purchase and maintenance of laboratory animals. According to the survey, about 14,000 people were engaged in the care of laboratory animals at that time. If agricultural research efforts had also been included, the figure would probably have been doubled. Results also indicated that 15% of the available positions were not filled. Furthermore, a projected 70% increase in the need for required personnel in all categories of biomedical research was estimated for 1973; but total manpower requirements were greatest for support personnel. It was further pointed out that a need for training existed for all types of personnel and that the training of animal technicians was ranked first in the order of need.

The need for animal technician personnel in the veterinary profession is also strongly in evidence. As the individual practitioner has become more familiar with the capabilities and competencies of the technician specifically trained as a veterinary assistant or nurse, the requirement for personnel in this career area has accelerated significantly in many sections of the nation. The reaction from the majority of veterinarians employing these paraprofessionals has been overwhelmingly affirmative.

At present, the demand for veterinary assistants, particularly in the northeastern part of the country, far exceeds the number of trained individuals available to accept positions. A survey report published by Stanford Research Institute[2] in 1965 (the most recent of its type), indicated that there were, at that time, approximately 7,500 small animal veterinary hospitals in the United States, where people spent $250 million a year for care and treatment of pets. On the basis of the growth rate of this profession, as well as continued improvement in the quality of animal medicine and surgery since the Stanford survey, the demand for the veterinary assistant is going to increase significantly and shortages in this career area could possibly reach acute levels in the near future. Additional programs for the training of technicians in this classification are in immediate need.

Present Setting - Delhi College

In recognition of the increasing demand within the research and breeding laboratories, as well as the veterinary profession, for versatile technicians trained comprehensively in animal and clinical techniques, Delhi College became one of the first, if not the first two-year college in the nation to respond to this need. In 1961 a program designed to educate and train students in the specialty of animal science technology was initiated at Delhi. As the result of a dynamic educational philosophy at this College, along with dedicated leadership and support, this program has developed into the largest, most comprehensive one of its type in the nation.

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[2] Stanford Research Institute. Long Range Planning Service. Pet Products, No. 252. August, 1965.

As the sponsoring institution, the Agricultural and Technical College At Delhi was established in 1913 and is one of New York State's pioneers in two year higher education. A unit of the State University of New York since 1948, it grants the degrees of Associate in Applied Science, Associate in Science and Associate in Arts. The College has seven instructional Divisions: Agriculture; Business Management; Construction Technology; Hotel, Restaurant and Institutional Management; General Studies; Continuing Education; and the Division of Vocational Education. Each division offers a number of choices of curricula.

As a comprehensive college, the instructional programs encompass career-oriented curricula leading to the Associate in Applied Science degree which prepares students for a group of related positions, rather than a single position or occupation; transfer curricula leading to the Associate in Arts and Associate in Science degrees, and occupation-trade training education.

Delhi College, in addition to its academic program, continues to foster an important basic requirement for higher education -- the sustained, inspiring and personal relationship between a student and a teacher. Members of the faculty are dedicated to helping students adjust to college and to life.

The College is located on a spacious campus overlooking the village of Delhi. An extensive program of new construction has been underway for several years. Twelve major new buildings are either completed, under construction or in a late stage of design. They include dormitories, dining halls, classrooms, laboratories, a library and a student center housing a gymnasium, theater and Student Union. Improvements have been made to the campus systems of roads, lighting, heat, water and sanitary services.

The village of Delhi, with a population of about 2,500, is on the West Branch of the Delaware River in the upper Catskill Mountains. It is the county seat of Delaware County, a predominantly rural area which is one of the State's leading milk-producing sections.

All curricula have been registered by the State Education Department of the University of the State of New York, and are approved for the purpose of awarding the degree of Associate in Applied Science(A.A.S.), Associate in Science (A.S.), and Associate in Arts (A.A.). Certificates are awarded upon the successful completion of a Vocational Education Program.

The Middle States Association of Colleges and Secondary Schools has granted accreditation to the State University of New York as an entity, and this status applies to the College at Delhi.

Description Of The Program

The Animal Science Technology Program as it presently exists at Delhi College has been designed to reflect the currently increasing demand throughout the nation for personnel with training in this specialty area.

Continuous liaison with the professions to be served, in concert with the recommendations of an Animal Science Advisory Committee has been a directing influence in the formulation of the philosophy and curriculum of this program.

In the development of the animal science curriculum an effort has been made to recognize and be responsive to the broad professional implications and employment potential which exists for technical support personnel in the biomedical research and veterinary career fields. In attempting to acknowledge the preference which the student may exhibit for indepth training in one of these specialty areas, the animal science curriculum has been delineated into major option areas, namely; the Laboratory Animal Technology Option and the Veterinary Assisting Technology Option. To further maximize the educational experience, the student may specialize in one option but with permission and advisement, also elect to take courses in the alternate one.

In addition to the requirements pertaining individually to each option, supplemental animal science core courses and general education offerings also constitute curricular obligations.

The program, as it relates to the Laboratory Animal

Technology option is directed toward preparation of the student to function in both supervisory and technical specialty capacities relating to this field. In addition to the establishment of a basic background in the fundamentals and practices associated with the maintenance, housing, husbandry, and breeding of laboratory animals, instruction is also provided thereafter in specialized phases of the technology relating to this option. Advanced training areas include laboratory animal vivarial management, gnotobiotic (germfree) techniques, endocrine surgery methods relating to various rodent species, technical report writing and selected animal experimental processes utilized in biomedical research. Clinical diagnostic laboratory procedures encompassing the specialties of microbiology, parasitology, hematology, urinalysis, histological techniques and radiology also comprises an essential part of the supplemental preparation in this option.

The primary objective of the curricular program in the Laboratory Animal specialty is intended to prepare the graduate to qualify for a variety of career positions, primarily within the biomedical research and laboratory animal breeding fields. The versatile and comprehensive nature of the training experience concommitant with this option should enable the individual to respond with equal effectiveness in both supervisory and technical capacities.

The Veterinary Assisting Technology option, which represents the second specialty in the Animal Science

Technology curriculum, is designed to provide technical training to the student desiring a career affiliation in this field. Graduates are employed in animal hospitals to give assistance and support to the practicing veterinarian.

As the role of the graduate veterinarian has enlarged, particularly in the area of companion animal practice, the need for qualified support personnel has become more eminent. The veterinary assistant is being trained to relieve the practitioner of many routine, time consuming duties such as laboratory testing, nursing care, surgical preparation and office procedures. Technical support of this type affords the veterinarian additional time and opportunity to concentrate on the professional aspects of practice, such as diagnosis, treatment and surgery.

The Veterinary Assisting curriculum continuously emphasizes the importance of veterinary medical ethics, as it relates to this profession. In addition to instruction in the techniques of animal nursing, other proficiencies classified as hospital support duties are also developed. This aspect of training involves the establishment of competence in completing routine blood, urine, parasitological and microbiological tests, as well as supervision of subordinate hospital personnel, preparation for and assistance during surgery, routine operation of X-ray equipment and participation in office management procedures. Preparation in this option should result in the development of technical skills and the ability to understand, anticipate and effectively dispatch the requests of the veterinarian.

In both options of the Animal Science Technology program an effort is made to equip the student with insights which are both professionally oriented and life oriented; these relate to acceptance of responsibility, human relations practices, group interaction concepts and decision making processes. The inclusion of these elements as instructional goals is intended to increase the effectiveness of the individual as an animal technician and as a contributing member of society.

Finally, the diversified character and flexible nature of the program enabling participation and development to the "fullest measure" of the individual's interest and potential, has resulted in an expansion of the career possibilities originally anticipated for Animal Science students. In addition to the primary employment objectives and opportunities representing each curricular option, graduates have further validated the effectiveness and scope of this program by qualifying for technician positions in a variety of adjacent professional areas. Delhi Animal Science graduates are currently employed on a routine basis in the biomedical research field (see items 1-2 from the following list) and in veterinary assisting positions (items 3-5). Additionally, the versatility of the technician trained in a program of this type, is further evidenced in (items 6-15).

1. Biomedical animal research technician (many specialty classifications)
2. Laboratory animal vivarium technician
3. Assistants to small animal veterinary practitioners
4. Assistants to large animal veterinary practitioners
5. Assistants to veterinarians specializing in equine practice
6. Small animal technicians in veterinary medical centers
7. Histological technicians, clinical technicians and microbiologists in human hospitals, medical and veterinary schools
8. Commercial breeding laboratory technicians
9. Zoological park animal technicians
10. Equine breeding farm technicians
11. Artificial inseminator technicians
12. Meat inspection service technicians
13. Public health inspector-technicians
14. Environmental health technicians
15. Armed Services Medical and Veterinar[illegible] Corps technicians
16. Agricultural and diagnostic laboratory technicians.

Further delineation of the several major categories listed above would result in many additional job title identifications and specialized employment possibilities for which the Delhi Animal Science Technology graduate could qualify.

CHAPTER II

DEVELOPMENT OF THE ANIMAL SCIENCE TECHNOLOGY PROGRAM AT DELHI

Early History

In 1960, the Chairman of the Agricultural Division, in conjunction with the administration at Delhi College, made a concerted effort to anticipate and be innovatively responsive to the need which existed for technicians in the rapidly developing professional areas proximal to the field of agriculture. As a result of this endeavor, the concept of implementing a two-year program of instruction to train technician assistants for the veterinary profession was formulated and developed.

Reactions and advisement relating to the initiation of a program of this type were solicited from the Dean and professional staff at the New York State Veterinary College at Cornell University, as well as from representatives of the American Veterinary Medical Association and members of the New York State Veterinary Medical Society. Responses obtained from the Veterinary College were substantially in favor of the program, whereas the prevailing attitude of the New York State Veterinary Medical Society members, at that time, (in answer to a consensus questionnaire) was only mildly affirmative. With the conviction that a superior program stressing ethics and quality would result in trained support personnel that would be beneficial to and accepted by the veterinary profession, the decision was made to proceed with its initiation.

Thereafter, following consultation with the staff at the New York State Veterinary College and members of the American Veterinary Medical Association, an introductory curriculum was developed and approved by the State University of New York Central Office.

The new and innovative Animal Science Technology program designed to train veterinary assistants (perhaps the only one of its type in the nation at that time) was initiated at Delhi College in September, 1961, with a class of eight students. Instruction in the technical courses was provided initially by one experienced graduate veterinarian. Within months after inception of this curriculum, many communications were received from professional personnel representing the pharmaceutical industry, medical schools and public health institutions requesting expansion of the course content to also include specialized training for personnel in the technology relating to laboratory animal research and breeding. Affirmative reaction by the College to this request resulted in curricular modifications which continued to provide a maximum learning experience to the student while increasing the scope of the instructional program to include two career options instead of one. The inclusion of laboratory animal technology to the Animal Science program had the effect of substantially widening the training potential and thus the employment base for the graduate.

Development of this discipline after the beginning year of 1961 resulted in six (of the first eight students) successfully completing the curricular requirements and graduating in 1963. Sixteen students from the 1962 class were graduated in 1964 and twenty-six from the 1963 class received diplomas in 1965. Thus, forty-eight students completed the program during the 1961-1965 period and its growth continued to accelerate.

Within three years after initiation of this curriculum an Animal Science Advisory Committee was appointed to provide guidance and direction to the total program (the Advisory Committee will be discussed in detail later in this chapter).

United States Office of Education Involvement

During the 1964-1965 school term, approximately three years following the initiation of the Animal Science Technology curriculum at Delhi College, an informal assessment of the progress and status of the program to that date revealed the following information:

1. The program was a unique and innovative curricular offering which had begun to supply trained support personnel to career areas where requirements for animal technicians were extreme.

2. Responses from pharmaceutical and medical laboratories that had employed small numbers of graduates from the three initial classes were overwhelmingly affirmative.
3. Veterinary practitioners in New York State had employed limited numbers of graduates as veterinary assistants with positive results. The attitude of the veterinary profession toward trained assistants in New York State and other sections of the northeast was becoming slowly, though increasingly more affirmative.
4. Student applications and acceptances to the program had increased each year (from eight students in 1961 to 49 student acceptances in 1964) as a result of this trend it was anticipated that, as the program gained additional recognition it would continue to grow, probably even at a more accelerated rate.
5. The growth potential, popularity and educational contribution identifiable thus far with this curriculum reflected implications which were national in scope. Perhaps Delhi with its "model" program could stimulate other colleges and universities throughout the nation to initiate similar programs to assist in alleviating the need for trained animal technician personnel.

In view of the successful performance of this technical offering during the initial three year developmental period at Delhi, along with the broader persuasive effect which it might have in promoting animal technician training on a national scale, the decision was made to communicate with the United States Office of Education in Washington, D. C. regarding the possibility of financial support for the continued enhancement and expansion of the program. This contact, which was made by representatives of Delhi administration and the Animal Science instructional staff, resulted in a proposal invitation. This was promptly submitted and subsequently evaluated and approved for funding. On June 1, 1965, a four and one-half year contract, entitled "An Experimental-Developmental-Pilot Program In Animal Science Technology," was awarded to Delhi College by the Office of Education. Expiration date for the developmental aspects of the contract was stipulated to be November 30, 1969.

Contract Provisions

To establish familiarity and insight relative to the terms and commitments of this contract, the following information is provided:

1. Description and Purpose

The Animal Science Technology program at Delhi was and continues to be an innovative venture in the two-year college field. It was possibly one of the first attempts anywhere to train individuals in a two-year curriculum to function on a semi-professional level within the veterinary and biomedical research professions. Traditionally, animal care personnel acquire their knowledge and skills through experience, or in study toward the baccalaureate degree in a related field, such as biological science.

The purpose of this contract was meant to provide for additional technical personnel, special services, scientific equipment and instructional materials needed to expand and improve the curriculum, continue development and approach new, more comprehensive educational goals and objectives concommitant with this program.

Priorities for equipment were focused primarily in the areas of laboratory animal science, clinical technology and surgery. Supplemental needs for equipment embraced selected basic science course areas which were included in the curriculum to provide the essential technical background on which to build the applied and "skills development" aspects of the program.

There was significant evidence that career programs such as this were and would continue to be needed on an increasing basis to support the veterinary profession, and all phases of the biological and medical sciences.

2. Objectives

The objectives and goals concommitant with this contract were directed toward the preparation of young men and women for a cluster of technical occupations ancillary to the veterinary, biological and medical professions. Specifically, the benefits forthcoming from U. S. Office of Education support along with appropriate financial assistance from the State University of New York, provided the resources necessary to expand and enhance the training experience for program participants. Students being prepared to assist practicing veterinarians in animal nursing, clinical and surgical support areas were more effectively trained in improved facilities, using more and better equipment. Those receiving instruction which was requisite to employment in support of the research investigator, as well as for supervisory positions in commercial breeding laboratories and animal vivarial operations, were similarly advantaged. Preparation for employment in state and federal public health laboratories and food inspection services was also improved as the result of enlargement of the curriculum.

Data resulting from this project has provided useful guidelines to interested individuals, educational institutions and other agencies throughout the nation.

3. Administration

The contract was continuously under the supervision of a project director in consultation with a committee of College staff members representing departmental instructional staff and the Dean of Faculty. The Advisory Council of the Animal Science Department, composed of seven individuals drawn from representative areas of the profession and industry, provided advice in the development of course content, the acquisition and use of instructional materials, the selection of scientific equipment, and evaluated the progress of the project on a continuing basis.

All of the aforementioned individuals and groups are responsible to the President of the College.

4. Procedures

The proposal was designed to develop a program to test the effectiveness of instruction and curriculum content for a new emerging semi-professional occupation titled Animal Science Technician, requiring two years of post-high school education and leading to the Associate in Applied Science degree.

Accordingly, provisions of the contract have:

a. Assisted in bringing the equipment and staffing of the program up to the standards identified as essential by the existing professional staff at Delhi and individuals representing various branches of the veterinary and research professions.

b. Assessed placement opportunities open to graduates of the new refurbished Animal Science Technology program and compared them with the placement patterns of the graduates of the original, more limited curriculum.

c. Determined the relative importance, as evaluated by employers of graduates of the expanded program, and by the graduates themselves, of each of the major content and skills areas incorporated in the curriculum as related to the specific job titles.

d. Determined the effectiveness of the graduates' preparation in each of the program content areas as rated by individual employers and graduates of the program.

e. Determined if differences in occupational placement opportunities exist between male and female graduates of the Animal Science program.

f. Determined which subjects and content areas in the post-contract program need to be revised and redeveloped in light of the data acquired in the evaluation process during and after completion of the contract period.

g. Determined effectiveness of the scientific equipment, teaching aids and instructional methods and the appropriateness of instructor qualifications as the elements and components of a successful program in animal science.

h. Determined the optimum format for a two-year degree program in Animal Science Technology which may be utilized by institutions regardless of geographic location.

5. Reports

Progress reports describing and attesting to the development of the Animal Science program during the entire four and one-half year period of the contract were submitted to the United States Office of Education Project Officer assigned to this contract, on a monthly, quarterly and annual basis. The annual progress report also included a proposed program budget for the succeeding fiscal year.

At the conclusion of the contract period, a final report document, encompassing the developmental aspects and evaluation relating to the total program, was submitted.

6. Time Schedule

Phase I - Initiated on June 1, 1965 - encompassed purchase and installation of equipment funded by the contract. Primary items of equipment were acquired during the first year of operation.

Phase II - Beginning September 1, 1965 - employed one technical assistant and a clerk-typist. Employment of a second technical assistant commenced June 1, 1966. The first technical assistant was transferred to New York State employee status on June 1, 1967; the second technical assistant was transferred to State status on June 1, 1969.

The clerk-typist became a State employee on October 1, 1969.

Phase III - Beginning June 1, 1966 - employed project evaluators. Services terminated upon submission of final program evaluation report on December 31, 1969.

Phase IV - March, 1966 - submitted first progress report, relating to progress during first partial academic year of operation of the project.

Phase V - March, 1967 - submitted second progress report, relating to development during the first two years of operation of the project.

Phase VI - March, 1968 - submitted third progress report. This report related progress during the first three years of operation of the project.

Phase VII - March, 1969 - submitted fourth progress report. This report related progress during the first four years of operation of the project.

Phase VIII - Received program evaluation data from evaluating team. Completed and submitted twenty-five copies of the final report document to the United States Office of Education in May, 1971.

7. Dissemination of Program Data

The results of this program were disseminated by presentation of developmental data at national and regional scientific meetings and by responding to individual inquiries on a continuing basis during and after completion of the contract period. Many requests for information about the curriculum were received from educational institutions across the nation.

The data which was made available related primarily to personnel requirements, course content, textbooks, instructional aids, scientific equipment, representation and function of the advisory council, use of consultants evaluation and placement of graduates.

Upon approval of the final report by the United States Office of Education, copies will be sent to the following agencies and organizations.

a. United States Commissioner of Education
b. United States Department of Health, Education and Welfare
c. United States Department of Agriculture
d. American Veterinary Medical Association
e. American Association for Laboratory Animal Science
f. American Medical Association
g. All veterinary colleges in the United States

h. National Academy of Sciences

i. National Science Foundation

In addition, all departments of the State of New York that have assisted in the establishment of this new project will also receive this document.

Compliance with Contract Provisions

The requirements concomitant with the Animal Science Contract were classified under the following headings:

1. General Provisions (Articles No. 1 through No. 18) - Stated as standard requirements for all government cost-reimbursable contracts. These provisions relate (in part) to regulations such as patent rights, non-discrimination in employment, examination of records, government furnished property and others.
2. Specific Provisions - Items previously discussed in detail and relating to the procedures, objectives and goals of the contract.

All items enumerated as General and Specific Provisions were complied with and completed as stipulated under the terms of the contract.

Fiscal Support

A. Federal Support

The fiscal provisions relating to the Experimental-Developmental-Pilot Program in Animal Science Technology, Contract No. OE-5-85-076, was administered on behalf of the State University of New York at Delhi, by the

Research Foundation of the State University of New York. Allowable costs associated with this contract were classified in the following categories:

1. Direct Costs - expenditures designated in this category include:
    - a. Personnel services and benefits
    - b. Consultant services
    - c. Travel and per diem
    - d. Supplies and materials
    - e. Teaching aids
    - f. Equipment
2. Indirect Costs or Overhead:

    Allowable costs relating to this aspect of the contract included a provisional rate of 20% of total direct salaries and wages, pending determination of allowable direct costs and the actual indirect cost rate by audit.

During the five budget periods (four and one-half years) representative of this contract, the total budgeted support from the United States Office of Education amounted to $139,200. As shown in Table I, slightly more than 40% of the total funds available were allotted during the first contract year. This support was utilized primarily to obtain additional staff and to procure items of capital equipment; both of which were essential in expansion and improvement of the program. Of the total $58,077 representing the Federal budget for the first

TABLE I. FISCAL SUPPORT (Federal and State) PROVIDED DURING THE 1965-1969 CONTRACT PERIOD (4-1/2 YEARS)

Developmental Year of Contract Fiscal Year	Year #1 1965-66		Year #2 1966-67		Year #3 1967-68		Year #4 1968-69		Year #5 Six Months 6/1--12/31/69		Budget Item Totals	
BUDGET ITEMS	FEDERAL	STATE	FEDERAL	STATE	FEDERAL	STATE	FEDERAL	STATE	FEDERAL	STATE	FEDERAL	STATE
Personnel	$10,600	$39,000	$17,345	57,978	$12,587	$82,574	$15,158	$115,975	$3,739	$70,300	$59,429	$365,827
Teaching Consultants	500	-	500	-	800	-	300	-	-	-	2,100	-
Project Evaluation Consultants	1,820	-	1,820	-	1,400	-	1,100	-	1,935	-	8,075	-
Employee Benefits	1,350	*	2,456	*	1,862	*	2,501	19,135	617	11,599	8,786	30,734
Travel	610	120	1,077	210	1,087	210	503	1,352	-	536	3,277	2,428
Supplies/Materials	2,650	2,850	1,935	2,175	1,561	4,150	1,302	3,800	-	1,900	7,448	14,875
Capital Equipment	38,427	13,543	-	-	-	-	-	-	-	-	38,427	13,543
Communications	-	-	400	400	450	500	640	1,050	70	525	1,560	2,475
Services	-	-	53	-	53	-	225	-	-	-	331	-
Final Report Costs	-	-	-	-	-	-	-	-	225	150	225	150
Other Direct Costs	-	-	-	-	250	-	250	-	225	-	725	-
Sub-Total Direct Costs	55,957	55,513	25,586	60,763	20,050	87,434	19,969** 21,979***	141,312	5,753** 6,811***	85,010	**127,315	430,032
Indirect Costs	2,120	-	3,500	13,250	2,517	18,000	3,031	88,892	747	51,155	11,915	171,297
TOTAL FEDERAL SUPPORT	58,077		29,086		22,567		23,000**		6,500**		139,230	
TOTAL STATE SUPPORT		55,513		74,013		105,434		230,204		136,165		601,329

* Combined with Personnel budget figure.
** Reflects new funds budgeted for fiscal year indicated.
***Reflects total budget approved for expenditure. Additional amount represents funds budgeted but not encumbered during previous years of the contract.

contract year, $38,427 was designated for equipment and $10,600 for personnel. A total of $2,320 was used to subsidize the initiation of various other services intended to qualitate the instructional process and to provide for professional evaluation of the program through the duration of the contract. Funding for the first contract year also furnished $2,650 for teaching aids, supplies and materials, as well as $610 for staff travel.

With the exception of Capital Equipment, indicated as a single entry item in the first year's budget, Federal support during years two through four (June 1966 - May 1969) provided for essentially the same contingencies as those specified in the first fiscal period. Subsidies to the program during the remainder of the contract included totals of $29,086 during Year #2 (1966-67) and $22,567 during Year #3 (1967-68). The $23,000 allotted for Year #4 represented the final increment to be utilized for program expansion and development. The final seven-month budget (June 1 - December 31, 1969), representing the concluding phase of the contract, furnished funds exclusively for preparation and submission of the final report document.

Line items trends and/or analysis relating to differences in allotments to individual budget areas on a year to year basis can be obtained by an in-depth examination of Table I.

The affirmative influences which United States Office of Education funding enacted upon the growth, development and improvement of the Animal Science curriculum will be enumerated later on a more individualized basis (professional staff - equipment - evaluation - curriculum) in relation to the chronological development of this program.

B. State Support

Simultaneous to receiving the Federal subsidization in the amount of $139,200, which became available at a timely interval in the development of this program, the State of New York also contributed substantially to its support, primarily in the basic areas of professional staff, laboratory facilities, equipment, and supply costs.

As enrollment increased from a total of 64 entering students in 1965 to 125 in 1969, the requirement for additional staff was evidenced, both in the Animal Science Department and General Studies Division, which offered general education courses in support of the Animal Science curriculum and other technical programs on this campus. An allotment of $39,000 by the State to augment Federal funds for personnel during the first year of the contract, was increased as staff increases occurred, to $115,975 through the fourth contract year. During the entire four and one-half year developmental period $365,827 in State support was provided for instructional and ancillary personnel under this program.

Due to continued growth of this curriculum, additional space and laboratory facilities had to be assigned during the 1966-67 school year. This laboratory building, the Animal Science Center, was a leased accommodation separated from the main campus. State funds were utilized to offset the $18,000 annual rental fee and additional maintenance costs. This budgetary item appears in Table I as part of the Indirect Costs figure from 1967-68. A total of $13,543 from State funds was also made available during the first year for the purchase of equipment.

Details relating to $14,875 in Supplies and Equipment expenditures, as well as other line items alluding to New York State support are listed in Table I. Direct subsidization of this program by the State of New York during the Federal contract period totaled $601,329.

C. Other Support

As an adjunct to the subsidization afforded the Animal Science Technology Program at Delhi by both the United States Office of Education and New York State, supplemental funding to be used specifically for the purchase of equipment, was also instrumental in extending the development of this curricular area.

In an effort to augment the selection of technical equipment and instrumentation available to the student in laboratory practice and skills courses, the Animal

Science Department submitted proposals which resulted in a total of $129,428 being awarded for this purpose. Specific information relating to these awards is outlined as follows:

1. The initial award totaling $40,000 was obtained in April, 1965, as the result of a proposal submitted under the Vocational Education Act of 1963 (P.L. 88-210);
2. The second subsidy totaling $54,428 became available in January, 1966, also as the result of a proposal filed under the Vocational Education Act of 1963;
3. The third supplement totaling $35,000 (50% State-Federal matching funds) resulted from an application in which funds were requested under Part A, Title VI of the Higher Education Act (P.L. 89-329).

The cumulative amount ($129,428) resulting from the three grant awards was utilized as stipulated for the purchase of materials and equipment needed to improve the quality of instruction relating to the Animal Science Technology curriculum.

Development - Chronologically (1961-1969)

To establish a comprehensive understanding of the eight-year developmental pattern identified with the Animal Science curriculum at Delhi, an effort has been made to classify the components of the program which were most influenced during this period. Significant changes, resulting from factors of growth and increased support have been elaborated chronologically as follows:

1. Professional Staff

The Animal Science discipline was initiated at Delhi in 1961. Instruction in Animal Science oriented technical courses for the eight students enrolled in the program was provided by one graduate veterinarian. Agricultural (animal husbandry) courses also required of Animal Science Technology students at that time were taught by other staff members within the Agriculture Division. General education requirements associated with this curriculum were and continue to be instructed by the General Studies Division at this College.

As the program continued to develop, a second veterinarian was added to the Animal Science technical staff in 1963. At that interval approximately fifty students were enrolled in the program.

Although student numbers increased again in 1964, allocation of additional staff did not occur until the following year. In 1965, with just over a hundred students represented in this curriculum, a third veterinarian was added. The same year, two paraprofessional technical assistants were employed to furnish support in laboratory oriented courses and other adjacent areas. Both paraprofessionals became available as a result of the United States Office of Education contract.

During the early months of 1967, a laboratory animal specialist with a Master of Science degree and extensive research experience was added to the faculty of this department to fill the position vacated by one of the veterinarian instructors.

Subsequent personnel changes included the departure of a second veterinarian in 1968 and immediate replacement by another with similar qualifications.

Finally, in 1969, as the result of total enrollment figures (for both years of the program) increasing to approximately one hundred seventy-five students, approval was obtained to add a third veterinarian to the departmental faculty.

Thus, by way of review, the instructional staff (during the eight year period of development) increased due to program growth from one veterinarian in 1961 to three veterinarians, a laboratory animal specialist and two technical assistants, a total of six personnel, by mid 1969.

The need for supplemental support from Agriculture Division (animal husbandry) faculty was considerably less in 1969 than at the beginning of the program in the early 1960's. Curricular changes, with more emphasis on specialized Animal Science courses (to be discussed later) resulted in the reclassification of most of the animal husbandry offerings from required to elective, or in some cases non-available status.

Faculty support relating to the general education courses required of Animal Science students and offered by the General Studies Division have increased as the student numbers in this curriculum have accelerated.

2. Student Selection

Although Delhi College has increased in size, scope, facilities and student enrollment during the period encompassing 1961-1969, the College admissions policy in general and student selection processes for the Animal Science Technology program continue at present to be essentially the same as they were in 1961. The admissions policy at this College reflects the ideal that the comprehensive, two-year college should offer to all able students the opportunity to pursue career training beyond the secondary school. Admission to the College is open to any high school graduate whose record and abilities indicate an opportunity for success in one of the programs offered by the College.

Applying this emphasis, both philosophically and procedurally, the student selection process relating to the Animal Science curriculum is elaborated as follows:

a. Each student seeking admission must be a graduate of an approved high school or possess a New York State General Equivalency Diploma and is required to take either the Regents Scholarship Examination or the State University Admissions Examination. In addition, each applicant for the Animal Science

Technology program must have one unit of algebra and two units of science, one of which must be chemistry.

b. Applications are processed in the Admissions Center immediately after receipt. Decisions and recommendations relating to the evaluation of each individual applicant are made as soon thereafter as possible. Utilization of this continuous or "rolling process" of selection (as opposed to "delayed selection" wherein the highest academic achievers are given preference) provides an equal opportunity for selection into the program of the minimally qualified student in need of a "chance" to succeed, as well as the student with a proven academic record and maximum potential.

c. Since the use of this technique encompassed the basic "C" average student and upward, a wide spectrum of ability levels were represented in each class of students pursuing this curriculum. This variation, rather than requiring a stratified approach to instruction, resulted in an interesting "mix" of unique proficiencies and potentials transcending all ability groups represented.

Even though differences in performance and achievement were in evidence, as would be expected from the randomized method of student selection, it was noted that motivation and interest on the part of individual participants were equally as important as previous academic record in the development of techniques and skills related to preparation for this career area.

d. College entrance examination results were used more frequently as a counseling device than a rejection method. Sub-test data (individual scoring in mathematics, English and science) was used as an indicator to provide appropriate guidance for remedial programs, if and when required.

e. Personal interviews with applicants were welcomed but not required as part of the admissions and selection process, unless there was a need to discuss academic deficiencies and recommend remedial course work prior to entry into the Animal Science program.

3. Student Enrollment

The developmental aspects of the Animal Science program relating to student enrollment and inclusive of the classes of 1965 through 1968 (the period involving the United States Office of Education contract) will be described in detail in Chapter VI of this volume. To supplement the information attesting to the growth of this curriculum prior to and immediately following the 1965-1968 evaluation period, additional data representative of the enrollment pattern for the entire 1961-1969 period and 1963-1969 graduation totals are provided in Table II.

TABLE II. STUDENT ENROLLMENT - GRADUATION DATA

ANIMAL SCIENCE TECHNOLOGY PROGRAM

1961 - 1969

Entering Class (Year)	Number of Students	Graduating Class	Number of Males	Number of Females	Total Number of Graduates
1961	8	1963	2	4	6
1962	20	1964	10	6	16
1963	32	1965	10	16	26
1964	49	1966	15	20	35
1965	64	1967	15	39	54
1966	63	1968	22	29	51
1967	80	1969	22	37	59
1968	112				
1969	125				
TOTALS	553		96	151	247

As shown in Table II, a total of 553 students were accepted into the Animal Science curriculum during the first nine years following initiation of the program. Of the 316 enrolled between 1961 and 1967 (graduation years of 1963-1969) a total of 247 students (78% of those entering) successfully completed the academic requirements and graduated. This total included 151 females (61%) and 96 males (39%). Enrollment figures for the following years of 1968 and 1969, as indicated, amounted to 237 students or approximately 40% of all those entering for the entire nine year period since the inception of this curriculum.

Currently, due to facility limitations, further growth of the program beyond 125 entering freshmen students each year will become increasingly more difficult until additional instructional space can be made available.

4. Student Services

Satisfactory adjustment by the student to college living is a matter of particular concern to the faculty and administration. Faculty advisors are assigned to each student, and a Counseling Center is available to advise and counsel students with academic, personal and vocational problems. Division chairmen and deans are also available for advice and counsel. Orientation programs for freshmen are initiated at the time of registration in the Fall and are carried on during the first academic semester.

Developments relating to the category of student services at this College continue as in the past to be responsive and offer a complete program supporting the needs of students on the Delhi campus. Since 1961, the basic changes involve increases in size (staffing and facilities) rather than scope of service provided.

Significant growth and expansion has occurred, particularly in the areas of student counseling, financial aids and career placement.

a. Student Conduct

Students attending Delhi College are expected to observe a proper standard of conduct both within and without the College. Any student who violates codes of common morality, honor or good citizenship, as stated in the "Code of Student Conduct and Behavior" and/or who refuses to abide by the regulations of the College, will be subject to such penalty as the circumstances justify, including suspension or expulsion.

b. Counseling

Certified counselors at Delhi strive to make the Counseling Center a complete information service. The Center is staffed to provide social counseling, guidance for personal problems and direction toward the improvement of study habits. In addition, it includes a career information library, and offers testing for vocational and academic placement.

Some counseling service exists outside of the Center. Students may also seek guidance from dormitory directors, administrators, academic advisors and two chaplains. Any student enrolled at Delhi can receive counseling at any time.

c. Financial Aids

Financial aids are available to many of Delhi's students, both from government funds and private scholarships. Awards, loans, grants and work-study programs allot financial assistance from government money to students, based on need.

The Delhi College Scholarship Program awards financial support from private donations in various amounts up to $500. Based on academic achievement, the program encourages talented and ambitious students with the ability to advance in programs offered at Delhi.

Students in the Animal Science program have benefited financially from scholarships made available during the past several years by the following companies and professional organizations:

1) American Association for Laboratory Animal Science (Metropolitan New York and Philadelphia Branches)
2) Avon Products Company
3) Carworth - Division of Becton Dickinson Company
4) Gerry Foundation
5) Norwich-Eaton Foundation

6) **WARDS** - Welfare of Animals Used for Research in Drugs and Surgery.

The College Work-Study Program, alluded to previously, has provided financial support for eligible students in the Animal Science program. Additionally, it has also represented an excellent training experience for the six to ten students each year assigned to the animal vivarium and clinical laboratories in the Animal Science Center. This program is part of the Federal Economic Act designed to assist able students, by providing part-time, on-campus and off-campus jobs.

d. Health Services

The Student Health Center on the Delhi campus staffs a full-time physician and two nurses to provide the student with personal health service. This service also includes student health insurance which finances clinical, dispensary and hospital care for full-time students, whether it is received on or away from campus. Insurance is obtained by students upon enrollment.

All full-time students are required to complete a health questionnaire and have a physical examination before registering with the College.

e. Housing

Most of the students at Delhi elect to reside in one of the five College residence units. Each unit is designed and equipped to provide pleasurable campus living.

Recreational facilities are provided in the dormitories such as: television, vending machines and tables for cards, pool, and ping-pong. Each unit also has laundry facilities and lounge area. Lounge space consists of study lounges and comfortable quarters to entertain guests.

Students living in College residence can readily receive information from residence assistants, and professional aid in problems from the unit's residence director.

Meals are provided by the College Dining Center located conveniently close to residence halls and instructional areas.

f. Career Planning and Placement Services

Full-Time Career Placement

Placement services to graduating seniors are the major function of the centralized Placement Center which, in cooperation with department chairmen and faculties of the several divisions, assists seniors in investigating and securing positions in career fields of their choice.

Any student, regardless of academic standing, is eligible for aid from the Placement Center. Services are not available to withdrawals, dismissals, or students who have completed less than 15 hours of course work at the College.

Second year students are instructed in all phases of career planning. Individual and group counseling sessions are conducted to assist in resume writing, interview preparation, job selection, job placement, and in developing a long-range career planning approach.

g. Student Activities

The college experience for Delhi students involves more than classwork and studies. They may take part in a campus social life to the degree of variety and involvement they desire, through clubs, organizations, entertainment, sports and cultural events.

5. Curriculum

As stated in an earlier section of Chapter II, curricular advisement at the beginning of this program was achieved through the joint efforts of the Animal Science Department instructional staff, in consultation with the New York State Veterinary College at Cornell, the American Veterinary Medical Association, the National Institutes of Health, the pharmaceutical industry and other representatives of the biomedical community.

Within the resources available to the College (staffing, facilities and equipment) during the beginning years of the program (1961-1964), efforts were made to construct the curriculum to reflect the recommendations of consulting institutions, agencies and individuals.

Although inroads were made at that time, complete responsiveness to this advisement was not achieved until a much later period (after 1965) in the development of the program.

Factors which restricted the expansion of the initial curriculum and which, under existing circumstances, were unalterable during that period, relate to:

a. Minimal fiscal support for a previously untried academic program

b. The influences of long established Animal Husbandry and Dairy Science programs which actually represented a curricular nucleus within the College Agricultural Division at that time.

The influences referred to in Item b (above) are readily observable in the initial Animal Science curricular outline representative of the program during the 1961-1964 academic period (see Curriculum Model I). In conforming to the academic schedule of the College, it should also be noted that the curricular structure was based on a three term, as opposed to two semester, design.

The first major revision in the Animal Science program occurred in 1965 and was made possible by the support obtained from the United States Office of Education contract which was awarded for the purposes of further developing this curriculum into a quality paraprofessional offering in the animal science technician career area. The fiscal support available enabled the procuring of personnel, equipment and supplies essential to expand the scope and simultaneously the quality of the program. Revisions in course structure and content resulted in the emergence of Curriculum Model II, the paradigm for the 1965 and 1966 academic years. The primary changes delineating it from Curriculum Model I were evidenced by the deletion of courses with an emphasis toward general agriculture and replacement with others oriented specifically toward the biomedical research and veterinary assisting fields. This trend was demonstrated most significantly by removal of courses such as Livestock Feeding, Animal Breeding and Agricultural Business, and the insertion of General Pathology, Animal Care and Anesthesiology, Zoonoses, Radiological Techniques, Axenic (Germfree) Techniques and Animal Laboratory Practice. A more complete understanding of course changes during this interval (1965-1966) can be obtained by a comparative study of Curriculum Models I and II.

Based on several equipment grant awards (see Fiscal Support, this chapter, for details), along with continued funding from the Federal contract and increasing subsidies from New York State, development of the program continued at an accelerated rate. In response to interim evaluation feedback from employed graduates (classes of 1965 and 1966), made available by the professional evaluators of this program, the curriculum was restructured again in 1967. The changes recommended by the graduates of these two classes and their employers (see Chapter VIII, Appendix B) resulted in the design and implementation of Curriculum Model III. The modifications concomitant with this model included a realignment of existing courses within the curricular framework, as well as continued deletion and addition of courses. For example, Livestock Production, Quantitative Analysis and Genetics were eliminated and simultaneously relevant animal science courses were added. These and other revisions are delineated in Curriculum Model III.

The final curricular modification of major consequence to the Animal Science Technology program occurred in 1969. At that time the "Core Concept" adopted for the freshman year reamined constant, however, the second year of the program was restructured to include two distinct option areas, namely, the Laboratory Animal Option and the Veterinary Assisting Option. Through the selection of a limited number of elective courses offered during the final three terms of the program, the student, with the assistance of a faculty advisor, had the prerogative of specializing in one of the two option areas, or electing courses which would provide appropriate training in both career fields. Curriculum Model IV outlines in detail the core elements, as well as the elective courses associated with this curriculum revision.

Course modifications occurring in the core sections of both the first and second years of Model IV included the addition of courses in Medical Terminology, Animal Reproduction and Genetics (reinserted in the core after deletion from the 1967-68 curriculum), Additional changes included restructuring Animal Care and Anesthesiology from Curriculum Model III into Laboratory Animal Science I and similarly redesigning Radiological and Surgical Procedures to become Radiology and Anesthesiology. The final core change involved the deletion of Organic Chemistry, thus a reduction in the total chemistry requirement from three courses (12 term hours) in 1966-1966 to a single three-hour course in Introductory Chemistry, stipulated in the current curricular paradigm. The basis for this change was linked to a shifting of course priorities which favored a more in-depth training experience in the animal and clinically oriented courses.

General education requirements relating to all academic programs offered by this College, including the Animal Science discipline, remained relatively constant during the entire eight-year developmental period covered by this report. These courses, which were and continue to be supplemental to the technical requirements, include offerings in the basic sciences, mathematics, English and the social sciences, and are provided by the General Studies Division of the College.

General education courses constitute approximately one-third (actually a minimum of 32 term credit hours) of the 96 hours required for the Associate in Applied Science (A.A.S.) degree offered at Delhi.

Minor curricular changes which involved general education courses in Curriculum Models II, III and IV allowed for:

a. Selection of social science courses other than those specified in the various curricular models (with approval of the faculty advisor)
b. Tracking each student into the mathematics course which most closely paralleled the individual's high school background in this subject.

Detailed considerations relating to the complete academic requirements and curricular considerations of the Animal Science program have been further enumerated in Chapter IV of this document under the heading The Curriculum.

As previously stated, the forces stimulating curricular change, particularly after 1964, were strongly linked to fiscal influences, interim program evaluation feedback and accelerated interest and growth of this curricular area. An overview, emphasizing the changes and development concomitant with the Animal Science Technology curriculum between 1961 and 1969, can be obtained by a comparative study of Curriculum Models I through IV, which were utilized in the gradual evolvement of the program during that period.

One final element relating to curricular change in the Animal Science program should be placed in a "projected," rather than developmental category, at this time. The case in point refers to the possibility of this College altering its academic year from the present three term system to a two semester arrangement within the next one to two years. In anticipation of this occurrence, the Animal Science Department has designed a new curriculum (Curriculum Model V) which will be utilized if and when this change occurs.

One of the most vexing problems associated with this type of schedule change relates to the consolidation of courses. Effective transformation from one system to the other involves organizing six terms of instructional material into course blocks valued at three to five credit hours each on the semester scale. Failure to defragment the term curriculum could result in a large variety of semester length mini-courses carrying one or two hours of credit and extremely difficult, if not impossible, to schedule.

In order to demonstrate course consolidation, as it pertains to the "projected" Animal Science semester curriculum, the following brief exhibit demonstrates semesters three and four of Proposed Curriculum Model V.

a. Clinical Techniques - a consolidation of term courses entitled: Hematology and Urinalysis, Animal Parasitology and General Pathology.

b. Clinical Assistance - A consolidation of term courses entitled: Anesthetic and Radiologic Techniques and Surgical Assisting.

c. Animal Microbiology - A consolidation of term courses entitled Applied Microbiology and Zoonoses.

Other elements of this "proposed" curriculum which are different than Curriculum Model IV refer primarily to:

(1) Course name changes (proposed)

  (a) Introduction to Veterinary Science identifies with Introductory Animal Science in the term schedule.

  (b) Introduction to Laboratory Animal Science identifies with Laboratory Animal Science I in the term schedule.

  (c) Veterinary Science I identifies with Clinical Techniques in the term schedule.

(2) Insertion of new courses (proposed)

  (a) Veterinary Science II

  (b) Laboratory Animal Science III

  (c) Environmental Science

CURRICULUM MODEL I

ANIMAL SCIENCE TECHNOLOGY CURRICULUM (1961-1964)

FIRST YEAR

FIRST TERM	Credit Hours
Livestock Production	3
Dairy Science	3
Division Orientation	0
English I	3
College Algebra I	3
Physical Education I	1
General Chemistry I	4
	17

SECOND TERM	
Mammalian Anatomy and Physiology	5
English II	3
Physical Education II	1
Microbiology	4
Organic Chemistry	4
	17

THIRD TERM	
Livestock Reproduction	3
Dairy Bacteriology	4
Small Animal Care	4
English III	3
Health	1
Genetics	3
	18

SECOND YEAR

FOURTH TERM	Credit Hours
Animal Breeding	3
Agricultural Business II	3
Veterinary Assisting	4
Animal Parasitology	3
American Government	3
	16

FIFTH TERM	
Animal Nutrition	3
Animal Health	3
Hematology & Cytology	4
Clinical, Research and Disease Control Programs	3
Introductory Economics	3
	16

SIXTH TERM	
Livestock Feeding	3
Food Sanitation	5
Clinical Laboratory Practices	3
Division Seminar	2
Introductory Psychology	3
	16

CURRICULUM MODEL II

ANIMAL SCIENCE TECHNOLOGY CURRICULUM (1965-1966)

FIRST YEAR

FIRST TERM	Credit Hours
Livestock Production	3
Dairy Science	3
Division Orientation	1
College Mathematics	3
Physical Education I	1
General Chemistry I	4
American Government	3
	18

SECOND TERM	
Mammalian Anatomy and Histology	5
English I	3
Physical Education II	1
Microbiology	4
Biological Chemistry	4
	17

THIRD TERM	
Dairy Food Bacteriology	4
Mammalian Physiology	3
Pathogenic Microbiology	4
Health	1
Quantitative Analysis and Instrumental Analysis	4
	16

SECOND YEAR

FOURTH TERM	Credit Hours
Office Practices and Records	3
General Pathology	3
Animal Parasitology	3
Animal Care & Anesthesia	3
English II	3
Introductory Psychology	3
	18

FIFTH TERM	
Animal Nutrition	3
Hematology	3
Zoonoses & Animal Research	3
Radiological Techniques	3
Genetics	3
Introductory Economics	3
	18

SIXTH TERM	
Food Sanitation and Meat Inspection	5
Histological Techniques	3
Axenic Techniques	3
Division Seminar	2
English III	3
	16

CURRICULUM MODEL III

ANIMAL SCIENCE TECHNOLOGY CURRICULUM (1967-1968)

FIRST YEAR

FIRST TERM	Credit Hours
Dairy Food Science	3
Division Orientation	0
Zoonoses and Animal Research	3
College Mathematics or College Algebra	3
Technical Reporting	1
Physical Education I	1
Introductory Chemistry	4
	15

SECOND TERM	
Mammalian Anatomy and Histology	5
English Composition I	3
Physical Education II	1
General Microbiology	4
Introductory Organic Chemistry	4
	17

THIRD TERM	
Livestock Reproduction	3
Mammalian Physiology	4
Applied Microbiology	4
Office Records, Hospital Practices and Pharmacology	3
Introductory Psychology	3
	17

SECOND YEAR

FOURTH TERM	Credit Hours
General Pathology	3
Animal Parasitology	3
Animal Care & Anesthesia	4
English Composition II	3
Health I	1
American Government	3
	17

FIFTH TERM	
Animal Nutrition	3
Hematology & Urinalysis	3
Radiology and Surgical Procedures	4
Histological Techniques	2
Laboratory Animal Health	3
Introductory Economics	3
	18

SIXTH TERM	
Food Sanitation and Meat Inspection	4
Principles of Axenic Technology and Gnotobiology	4
Division Seminar	2
English Composition III	3
Genetics	3
	16

CURRICULUM MODEL IV

ANIMAL SCIENCE TECHNOLOGY CURRICULUM (1969)

FIRST YEAR

FIRST TERM	Credit Hours
Introductory Animal Science	3
Medical Terminology	1
Freshman Mathematics	3
General Microbiology	4
Introductory Chemistry I	3
Physical Education I	1
	15

SECOND TERM	
Mammalian Anatomy and Histology	5
Zoonoses	3
English Composition I	3
Introductory Sociology	3
Physical Education II	1
	15

THIRD TERM	
Animal Reproduction	3
Clinical Management	3
Mammalian Physiology	4
Applied Microbiology	4
Introductory Psychology	3
	17

SECOND YEAR

FOURTH TERM	Credit Hours
Anesthetic and Radiologic Techniques	3
Animal Parasitology	3
Laboratory Animal Science I	4
English Composition II	3
Health I	1
Selected Animal Science Elective Courses	(+)
	14 (+)

FIFTH TERM	
Animal Nutrition	3
General Pathology	3
Hematology & Urinalysis	3
Introductory Ecomomics	3
Selected Animal Science Elective Courses	(+)
	12 (+)

SIXTH TERM	
Animal Science Seminar	1-3
Genetics	3
English Composition III	3
Selected Animal Science Elective Courses	(+)
	7-10 (+)

ANIMAL SCIENCE ELECTIVE COURSES

Laboratory Animal Option	
Laboratory Animal Science II	4
Laboratory Animal Diseases	3
Technical Reporting	1

Veterinary Assisting Option	
Animal Health	3
Surgical Assisting	2
Veterinary Science	3

UNCLASSIFIED ELECTIVES (Either Option)

Food Sanitation & Inspection	4
Histological Techniques	2
Horse Management	3

CURRICULUM MODEL V

ANIMAL SCIENCE TECHNOLOGY CURRICULUM
(PROPOSED FOR SEMESTER SYSTEM - 1970 or 1971)

FIRST YEAR - CORE CURRICULUM

FIRST SEMESTER	Credit Hours	SECOND SEMESTER	Credit Hours
Comparative Anatomy and Physiology	5	Applied Physiology	3
Introduction to Veterinary Science Technology	3	Introduction to Laboratory Animal Science	4
Mathematics	3	English I	3
Health	2	General Microbiology	4
Chemistry	3	Social Science I	3
	16		17

SECOND YEAR - SPECIALTY CURRICULA

VETERINARY ASSISTING TECHNOLOGY		LABORATORY ANIMAL SCIENCE TECHNOLOGY	
THIRD SEMESTER		THIRD SEMESTER	
Clinical Techniques	5	Clinical Techniques	5
Veterinary Science I	3	Laboratory Animal Science II	4
English II	3	English II	3
Social Science II	3	Physical Education	1
Elective	3	Social Science II	3
	17		16
FOURTH SEMESTER		FOURTH SEMESTER	
Clinical Assistance	5	Clinical Assistance	5
Veterinary Science II	3	Laboratory Animal Science III	3
Animal Microbiology	4	Animal Microbiology	4
Environmental Science	3	Histological Techniques	2
Physical Education	1	Environmental Science	3
	16		17

VETERINARY, LABORATORY ANIMAL AND AGRICULTURAL RELATED ELECTIVES

Animal Nutrition	3	Histological Techniques	2
Animal Health	3	Environmental Science	3
Horse Management I	3	Special Problems	2

6. Facilities

When the Animal Science Technology program was initiated in 1961, the limited number of students enrolled in the first class, coupled with the agricultural orientation of the curriculum at that time, resulted in only minimal facilities requirements specifically associated with this new discipline.

Since a portion of the initial Animal Science technical curriculum, particularly in the 1961-64 period, had been superimposed on courses already being offered as part of the Animal Husbandry and Dairy Science options within the Agricultural Division (see Curriculum Model I, Chapter II - Item 5. Curriculum), the laboratory space available in the College Agricultural Science Building and facilities at the College Farm were used effectively to serve all three option areas simultaneously. Additional laboratory courses which were designed specifically for the Animal Science program were scheduled separately within the facilities complex just mentioned.

The animal vivarium, during the early developmental period, was represented by only a few plastic cages which were populated by limited numbers of small laboratory rodents. This facility was located in the College greenhouse adjoining the Agricultural Science Building and its use was shared with students in the General Agriculture option.

In 1965, continued growth of the program, along with provisions of the recently awarded United States Office of Education contract, and accompanying curriculum changes, the requirement for facilities designed to accommodate larger numbers of students in more specialized courses became eminent. At that time additional temporary space on campus was assigned to accommodate some of the laboratory courses and the need for an enlarged animal vivarium. In the absence of appropriate equipment, a course in radiological techniques (inserted in the curriculum in 1965) was taught in the Radiology Department of the local hospital. In 1966, a sizable three floor, cement block structure, adjacent to the main campus, was located, renovated, and became the permanent Animal Science Center. It continues to be used in this capacity at present.

The Animal Science Center, which will be discussed in detail in Chapter III of this report, contained clinical, basic science, surgical and animal laboratories. It also housed an enlarged animal vivarium containing space and caging for eight species of animals, including accommodations for dogs and cats.

Although the Animal Science Center provided facilities for most of the specialized laboratory requirements in this curriculum, scheduled lectures for all courses were and continue to be presented in instructional areas on the main campus. The College Farm also continues to be used as a teaching laboratory, particularly in courses which relate to veterinary assistant training. General education requirements relating to this curriculum were and continue to be presented in a lecture room, laboratory, library complex located on the main campus.

7. Equipment

During the initial three years of the Animal Science Technology program, the circumstances relating to equipment closely paralleled those just described under the heading of Facilities. The curricular relationships elaborated within the Agricultural Division at that time between the long established Animal Husbandry, Dairy Science, and General Agriculture options,and the newly implemented Animal Science Technology option, enabled the frequent utilization of staff and facilities, as well as equipment, on an interchangeable basis. Obviously, limited Animal Science enrollment at that time and a curricular prototype that had not yet evolved into the highly specialized instructional program which it has become, enabled the operational flexibility concomitant with the 1961-1964 period.

In 1965, as a result of accelerating student enrollment, in conjunction with increasing fiscal support from Federal and local (State) sources, a series of innovative changes in the character of the program began to occur. In addition to the evolvement of facilities (just discussed) which in 1966 resulted in a permanent Animal

Science Center, redesign of curriculum and improvement of instructional methods had also been initiated. Much of the impetus for change in these two areas (curriculum and instruction) was a direct result of the increasing amount of technical equipment and instrumentation that had become available for use in the Animal Science program.

During the academic year 1965, as the result of an equipment allowance reflected in the initial budget of the United States Office of Education Contract, plus a New York State equipment subsidy and a Federal Vocational Education equipment grant, approximately $92,000 was appropriated for the purchase of essential equipment needed to enable curricular expansion and increased effectiveness in instruction. These funds were used primarily to supplement the equipment requirements in the clinical, microbiological and animal laboratories, as well as the laboratory animal vivarial area. Audio-visual instructional components were also obtained from these resources.

In 1966, a second Federal Vocational Education equipment grant, totaling more than $54,000, enabled the installation of an environmental control system (air conditioning-ventilating-filtering) in the surgical and vivarial areas of the Animal Science Center. Additionally, these funds were also used to equip the radiology and surgical laboratories in this facility. The resources remaining from this grant were used to obtain essential items for the basic sciences (anatomy and physiology) laboratories.

In 1969, a final equipment grant totaling $35,000 was awarded under Title VI of the Higher Education Act (P.L. 89-329), Federal-State matching funds. This subsidy enabled the purchase of laboratory instrumentation and equipment encompassing virtually all laboratory specialty courses, including the basic and clinical sciences and laboratory animal sciences, as well as surgery, anesthesiology and radiology. Additional audio-visual auto-tutorial and photographic equipment was also obtained with this grant.

In summary, within the 1965-69 period, a total of $181.418 was made available through five separate contracts or grant awards for the purchase of equipment needed to expand the scope and further qualitate the curricular elements of the Animal Science Technology program.

A detailed listing of equipment purchased by the grant awards and currently in use in conjunction with this program is enumerated in detail in Chapter VIII, Appendix C of this document.

8. Instructional Specialists

During the entire eight year history of this program the academic goals paralleling its development have been accomplished with increased effectiveness by the utilization of Instructional Specialists to upgrade the competencies of the departmental staff and to supplement and extend the learning experiences of the student.

Individuals so classified were trained specialists with established expertise in one or more of the many professions directly related or proximal to the Animal Science field. As a result of this type qualification, the Instructional Specialists were instrumental in adding dimension to both lecture sessions and laboratory exercises, by introducing and applying essential relevant concepts and techniques to the courses in need of improvement. The implementing of selected new courses into the curriculum was made possible in several instances only through the efforts of these consultants. For example: Axenic Techniques and Radiologic Techniques, both inserted into the 1965-1966 curriculum (see Model II), were taught for the first time (1965) only after frequent contact of the Animal Science staff with consultant specialists.

The most extensive use of the Instructional Specialist in the development of the Animal Science program occurred during the 1965-1969 period when fiscal support was available from the United States Office of Education to expand and improve the curriculum and the methods of instruction. During that four and one-half year period the Federal budget provided $2,100 in funds for that purpose.

A representation of the related professions and professional fields from which Instructional Specialists and consultants were selected to assist both the Animal Science staff and students are enumerated below:

a. Veterinary practitioners in both small and large animal practice
b. Public health veterinarian
c. Pharmaceutical research microbiologist
d. Commercial breeders of laboratory animals
e. Biomedical research personnel
f. Laboratory animal services supervisor
g. Federal meat inspection and regulatory personnel
h. New York State sanitarian personnel
i. Radiological specialists
j. Professional veterinary staff from the New York State Veterinary College at Cornell University
k. Inspection personnel from the New York State Department of Agriculture and Markets
l. Professional microbiologists from the New York State Health Department
m. Previous graduates of the Delhi Animal Science program, employed in biomedical research or veterinary assisting positions
n. Representatives of companies supplying equipment and instrumentation to both research and veterinary fields
o. Specialists from the Delhi College instructional

staff representing the Engineering Sciences, Business and General Studies Divisions.

Current utilization of the Instructional Specialist is on a much reduced basis, as compared to the 1965-1969 period. This change is undoubtedly due to increased proficiencies of the professional staff and curricular modifications of a less extensive type than existed during that period. Though still an important adjunct to this program, participation of the Specialist is directed almost entirely at present toward student contact in lecture-laboratory sessions.

9. Library

The Library at Delhi College has changed extensively during the developmental period under consideration. In the early 1960's approximately 8000 book volumes were available to the students enrolled at the College. These were located in a small, inappropriately equipped Library facility. Since that time a new Library-instructional complex was constructed in 1966. This new facility provided the additional space required to expand the resources and services necessitated by continued student growth and curricular development at the College. In response to these factors the Library at present contains more than 25,000 book volumes, 500 periodicals, thirteen national and international newspapers and several thousand technical bulletins, government publications, phono-records, audiotapes, filmstrips, microforms and other library materials.

Because of the extensive orientation and growth in courses and curricula which relate to Animal Science and agriculturally oriented career training, the procurement and availability of volumes relative to these areas is proceeding at an accelerated rate.

Library resources expand beyond the collections at Delhi, however, through state and regional inter-library loan agreements. In addition, the Library employs a professional staff to assist the student in locating and utilizing reference and instructional materials.

To assure that Animal Science students obtain a thorough understanding and indoctrination related to locating and using technical literature, it has been the practice since 1968 to include library orientation exercises in the Technical Reporting course. The Library staff has assisted in making this a meaningful learning experience for the student.

Construction of a new Library complex, with a capacity of 60,000 volumes, has been approved and will be constructed within the near future. This will extend even further the instructional resources available to students on this campus.

10. Instructional Resources

One of the primary objectives in technically oriented career education programs is to simulate as closely as possible in the classroom and laboratory situations and learning experiences which will translate as performance criteria once the graduate attains employment status. The development of a conceptualistic approach to instruction deemed essential in the teaching of techniques and methods essential to career oriented students, is more effectively accomplished when supplemental instructional materials are utilized which add dimension and understanding to course content and accelerate the learning process.

The concept of instructional resources has been adopted and elaborated in the Animal Science curriculum since the beginning of this program. It has been the consensus of the professional staff in this department that the effectiveness of both the instructional techniques and learning processes are closely linked to the extensive use of teaching supplements and conceptual paradigms. The academic and career achievements associated with the graduates of this program reflect a quality and scope of instruction associated with this curriculum which would not have been attainable without the exploitation of a wide variety of teaching resource materials.

The availability and usage of instructional media within the Animal Science program accelerated during the developmental period in proportion to the increase in fiscal support, acquired from Federal and local sources for purposes of curricular expansion and improvement. Thus, in 1965 and thereafter, funds became available which enabled the procurement of teaching resource materials and other ancillary items and services associated with upgrading of course content and teaching techniques.

At present the major supplements to the presentation of course materials in this department and classified in the category of instructional resources are enumerated as follows:

a. Audio tapes
b. Biological specimens
c. College Farm facility
d. Closed circuit television
e. Current scientific textbooks
f. Field trips to industrial and governmental laboratories
g. Films
h. Film strips
i. Guest lectures
j. Instructional specialists
k. Live and preserved animals
l. Laboratory animal vivarial facility
m. Overhead projectiles
n. Professional journals
o. Professional meetings (student attendance)
p. Scientific instruments and equipment

q. Skeletal models

r. Slides (35 mm) instructional

s. Technical papers

t. Video tapes

Further consideration of special instructional materials and the specific areas of application relative to this program will be elaborated in detail in Chapter III of this document.

11. Advisory Committees

In the development and enhancement of technical programs on this campus, it was and continues to be the policy of this College to recommend the appointment of Advisory Committees to cooperate with faculty and staff members within the various curricular areas, in the attainment of the multiple objectives associated with each technical program. Committees are composed of individuals representing industry, government, the field of education, professional societies and the technical professions.

Advisory Committees provide direction and expertise in specialized categories relating to curricula, facilities, staff, recruitment and placement of graduates, and many other areas of importance concomitant to the development of academic excellence in technical career education programs.

The establishment of an Advisory Committee to provide guidance and advisement to the Animal Science program was forthcoming in 1964, during the third year after its initiation. The newly formed committee was composed of respected, highly qualified and experienced individuals representing the following professional areas:

a. The New York State Veterinary College at Cornell University
b. The New York State Veterinary Medical Society
c. The Society for the Prevention of Cruelty to Animals (ASPCA)
d. Laboratory Animal Industry
e. Veterinary Practitioners (private practice)
f. The Biomedical Research Field

The Advisory Committee, composed of eight members, meets formally once or twice a year at Delhi College and is advised of the progress of the program during the interim periods, as required, by written and/or telephone communications.

Periodic changes in individual membership of this committee occurs as a result of the "rotating membership" procedure which is followed by Advisory Committees at this College.

The Animal Science Advisory Committee, since its inception, has reflected the spirit of enthusiasm and accomplishment associated with the development of this program. The commitment and interest of the membership has provided the guidance and direction so urgently needed by new and emerging, career oriented, educational programs.

12. Evaluation

During the initial three years of the Animal Science Technology program the complete efforts of the professional staff were directed toward development of curriculum, completion of instructional assignments, solving of logistical problems and being responsive to the day to day details attached to this new and innovative discipline. Therefore, from 1961-1964 program evaluation data available pertained only to student profiles and academic records. At that time no formal effort had been made to procure performance data on the small number of graduates employed as research technicians or veterinary assistants. Occasional contact with graduates and/or employers provided only an informal means for evaluating the academic effectiveness of the program during that period.

It was not until the fourth year after initiation of this discipline, and as a direct result of the developmental contract with the United States Office of Education, that a formal system to evaluate the status, performance and progress of the Animal Science graduate, was inaugurated. In complying with the provisions of the Federal contract, a team of professionals, specialists in the field of educational curriculum evaluation, were selected for this purpose in mid-1965.

To implement the collection of follow-up data relating to four graduating classes (1965-1968) involved in this developmental study, Dr. Joe P. Bail and Dr. William E. Drake, who comprised the evaluating team from Cornell University, in cooperation with the Animal Science departmental staff, planned and designed an evaluation instrument prototype for specific use with this program. This basic model was then modified to permit data collection from three different sample populations as follows (see Chapter VIII Appendix A for samples of each instrument):

a. Evaluation Schedule - Form A - designed for employed graduates

b. Evaluation Schedule - Form A-1 - designed for graduates pursuing further education

c. Evaluation Schedule - Form B - designed for employers of graduates

Thereafter, during the following four years, the instruments were utilized for the collection of data from graduates of each year's class and respective employers. A time lapse of approximately six months occurred from the time of graduation until the evaluation forms were forwarded to the graduates and employers. This lag period enabled the individual to become established either occupationally or in a new educational setting before being asked to evaluate the Animal Science program.

Immediately upon receipt of data from each class of respondents, information was compiled and analyzed. (Refer to Chapter VIII Appendix B for additional information on statistical data follow-up) Frequent communications, including scheduled conferences, were established between the evaluating team and the Animal Science staff. This type liaison was essential in providing feedback information with which to evaluate the curriculum and substantive course materials on an interim basis. Several mid-program changes were effected in response to the receipt of indicative data from both graduates and employers.

In early 1969 the professional evaluators, in concert with the Animal Science Department's project director assigned to administrate the Federal contract at Delhi, drafted a comprehensive outline to be utilized in the preparation and writing of the final report document, due after the completion of the contract period.

Finally, in April 1970, Professors Bail and Drake submitted a detailed, final report encompassing the total evaluation study for the four year developmental period of the Federal contract. The comprehensively prepared report is now contained in this final report document (in total) as Chapter VI and Appendices A and B of Chapter VIII.

13. Employment of Graduates

Information representative of the total graduating classes encompassing the years 1963-1969, as it relates to career employment, is indicated in Table III. In consideration of this data, it is noted that during this period 247 students were graduated from the Animal Science Technology program. The largest class (59 students) completed the curriculum in 1969.

To provide information relative to post graduate status, four classifications have been delineated as follows:

a. Animal Technician Career Field
b. Veterinarian Assistant Career Field
c. Continuing Education
d. Unclassified (non-employed and others)

Consideration as to total graduates and percentage of total graduates included in each classification indicates, according to current available data, that 78 graduates (32%) are employed in the Animal Technician field, 52 graduates (21%) are working as Veterinary Assistants, 90 graduates (36%) are in a continuing education status. Continuing education, in most instances, is directed toward the baccalaureate degree in the biological sciences, large animal sciences, or laboratory animal science areas. Limited numbers of individuals in the continuing education category (approximately six to eight) have completed baccalaureate programs and are currently enrolled in the New York State Veterinary College at Cornell.

The final data group representing an unclassified status contains 28 graduates, or 11% of the total. Individuals in this classification are either employed presently in career fields unrelated to Animal Science Technology, or are in a non-working situation.

Although not indicated in Table III, the general trend, particularly during the 1966-1969 period, which appeared to be emerging and supported (in part) by available data, suggests that Veterinary Assisting positions are filled primarily by female graduates and slightly larger percentages of male than females elect to delay employment in favor of pursuing further education.

Additional detailed information relevant to post graduate status (encompassing the classes of 1965-1968) is available in Chapter VI of this study.

TABLE III

EMPLOYMENT AND CONTINUING EDUCATION INFORMATION RELATIVE TO GRADUATES OF DELHI COLLEGE (STATE UNIVERSITY OF NEW YORK)

ANIMAL SCIENCE TECHNOLOGY PROGRAM FROM 1963-1969

Graduating Class (Year)	Number of Graduates	POST GRADUATION STATUS				
		Animal and Bio-Technicians	Veterinarian Assistants	Continuing Education	** Unclassified	Total
1963	6	2 (33%)	2 (33%)*	1 (17%)	1 (17%)	6
1964	16	5 (31%)	0 (0%)	7 (44%)	4 (25%)	16
1965	26	12 (46%)	5 (20%)	7 (27%)	2 (7%)	26
1966	35	17 (49%)	5 (14%)	10 (28%)	3 (9%)	35
1967	54	16 (29%)	16 (29%)	17 (31%)	6 (11%)	54
1968	51	11 (20%)	8 (16%)	25 (50%)	7 (14%)	51
1969	59	15 (25%)	16 (27%)	23 (39%)	5 (9%)	59
Totals	247	78 (32%)	52 (21%)	90 (36%)	28 (11%)	247

* Percentages calculated to nearest whole percent.

** Represents graduates in unclassified employment categories or married female graduates not employed.

CHAPTER III

FACILITIES, EQUIPMENT AND SPECIAL INSTRUCTIONAL MATERIALS

I. Facilities and Equipment (Requirements, Design, Utilization and Justification)

Laboratory facilities needed to accommodate the accelerated growth of the Animal Science curriculum were alluded to briefly in Chapter II, Part 6, of this document. The final phase of the facilities development program (to be related in detail in this chapter) occurred in 1966 and resulted in the acquisition and modification of a structure which became the Animal Science Center.

In planning the renovation of this building, the departmental staff, in conjunction with architectural consultants, attempted to provide maximum flexibility and utility of design that would accommodate the specialized laboratory requirements of a highly diversified program which, from 1961-1966, had a recorded history of accelerated growth and curricular change. It was generally agreed that the requirements for technical instruction in the Animal Science Center could be most effectively met by designing and adapting this two floor concrete block structure (containing approximately 8300 square feet of space) to include teaching laboratories, facilities, an animal vivarium, and the required ancillary support areas. These are presented in outline form and delineated individually according to floor levels.

A. First Floor - Total space available: 4125 sq. ft.

(See Facilities Exhibit A-1)

1. Receptionist area and lobby
2. Staff offices
3. Surgical Laboratory
4. Clinical Pathology Laboratory
5. Basic Sciences (Anatomy and Physiology) Laboratory
6. Sterilization Room
7. Preparation Room

B. Basement Floor - Total space available: 4167 sq. ft.

(See Facilities Exhibit B-1)

1. Radiographic (X-ray) Laboratory (3 rooms)
2. Clinical (Animal Techniques) Laboratory
3. Animal Vivarium (3 animal rooms and dog run area)
4. Cage cleaning area
5. Locker rooms
6. Storage areas

In establishing the profile and functional characteristics of the Animal Science Center, an integrated approach incorporating the design concepts, equipment requirements and instructional utilization of each laboratory and ancillary area will be elaborated on an individual basis. The objective of this approach is to provide a comprehensive understanding encompassing the total operation of this facility.

Consideration of each individual area follows:

A. First Floor

1.-2. Administrative Area. This section, containing approximately 1125 sq. ft. of space, was designed to include a Receptionist Office and Lobby area, as well as four separate Faculty Offices. This arrangement provided an excellent working environment and also enabled efficient communications between members of the professional staff and the secretary.

A Departmental Library, consisting of technical volumes on permanent loan from the College Library, was located in one of the office areas and maintained by technical assistant personnel.

The Lobby was utilized primarily by students, sales personnel and others having appointments with members of the professional staff.

In addition to routine office furniture and equipment, this area was also supplied with photocopy and mimeograph machines which were used extensively in the preparation and duplication of instructional supplements and other materials. Dictation equipment was also available for use by the departmental faculty.

3. Surgical Laboratory. This instructional area was 24' x 24' in size and contained 576 sq. ft. of space. It was designed to include a maximum

amount of open floor area to allow for the mobility required in student instruction of the several courses scheduled for presentation in this laboratory. As shown in Facilities Exhibit A-II, this room was outfitted to enable its usage as a surgery area and also as an animal treatment room. To provide the effective controlled environment required during surgery, this area was air conditioned.

Drugs and narcotics used in surgery and animal treatment were located (in accordance with State and Federal Regulations) in a wall mounted double lock-type cabinet. Other fixed items (cabinets for storage of surgical and other supplies) were situated around the periphery of the room. A complete furnishing of this laboratory included the following major items of specialized equipment:

a. Three surgical tables, each equipped with ceiling-mounted, adjustable, operating room lights

b. Two inhalant anesthesia machines which were used with non-explosive, non-combustible anesthetic materials. (This laboratory was not grounded against static electricity, therefore, ether anesthesia could not be used.)

c. Multiple physiological recorder (Physiograph "6")

d. Electrocardiograph

e. Electrocautery

f. Monitoring oscilloscope

g. Animal cavitron (teeth cleaning instrument)

h. Wall-mounted opthalmoscope-otoscope

i. Television camera and monitor (used for closed circuit televising of surgical procedures)

j. General purpose and specialized surgical instruments

k. Benedict-Roth metabolism apparatus

l. Surgical recovery cage

m. Animal scales (300 lb. capacity)

As a result of the outfitting and flexible design of this laboratory, it was a viable instructional area, not only for the Surgical Assisting course, but also for selected segments of other Animal Science courses including Anesthetic and Radiologic Techniques, Veterinary Science, Clinical Management and Mammalian Physiology.

4. Clinical Pathology Laboratory

This laboratory, which measured approximately 20' x 45' in size, and by the nature of its use was the largest in the Animal Science Center, was also structured as a multi-purpose teaching area. As shown in Facilities Exhibit A-III, the room was provided with five tiers of student work tables (four students per table). The four student stations at each table (total 20 stations) were each equipped with a sink and a gas-air outlet, in addition to a microscope storage cubicle and a three objective (oil immersion) microscope. Fixed wall and base mounted storage cabinets (needed to assure ready availability of a variety of clinical supplies and instruments) occupied one wall of the room. Maximum illumination (of particular importance in this area) was attained by fluorescent light fixtures and a series of windows along the outside wall.

Most of the fixed items of equipment used to furnish this facility are shown in Facilities Exhibit A-III. A partial listing of instructional items which have not been previously mentioned, but were extensively used and essential in the operation of a multi-purpose clinical laboratory, included the following:

a. Autotechnicon

b. Regular paraffin cutting microtomes

c. Freezing microtome

d. Paraffin oven

e. Paraffin dispenser

f. Tissue water bath

g. Analytical balance

h. Flame photometer

i. Photoelectric colorimeter

j. Coulter blood and particle counter

k. Pipette shaker

l. Micro-hematocrit centrifuge

m. Table top (regular)centrifuge

n. Refrigerated centrifuge

o. Freeze drying apparatus

p. Water bath

q. Fluorescent antibody microscope

With the specialized equipment and facilities representative of this laboratory area, it was adapted to the instruction of several courses which were clinically oriented; these included Hematology and Urinalysis, Animal Parasitology, Histological Techniques, Applied Microbiology and Animal Science Seminar. The Clinical Pathology Laboratory, because of curricular emphasis in the clinical sciences, was probably one of the most extensively utilized facilities in the Animal Science Center. The design and outfitting of the work area affords maximum mobility and effectiveness in the teaching and skills development process, which were stressed as primary objectives in this training program.

5. *Basic Sciences* (Anatomy and Physiology) *Laboratory*

In anticipation of the didactic approach required to effectively instruct the freshman student in fundamental laboratory concepts relating to courses in *Mammalian Anatomy* and *Mammalian Physiology*, the *Basic Sciences Laboratory* was planned as a maximum size instructional facility and as such was allotted 928 sq. ft. of space. The dimensions and design of this room (see *Facilities Exhibit A-IV*) were intended to provide an instructional environment which was spatially adequate and also allowed for maximum and unobstructed maneuverability of students and staff during laboratory sessions. These requirements reflected both mechanical and instructional characteristics of the course as follows:

a. Canine cadavers (one per two students) required for *Mammalian Anatomy*, were removed from a basement storage area, brought by the student to the dissection table and returned to storage at the conclusion of each laboratory period.

Wide aisles and access between dissection tables were needed to minimize the time spent and maximize the efficiency with which this process was completed.

b. Live animals, including dogs, cats, rodents and other larger species were made available and utilized for frequent demonstration in the Mammalian Physiology course. Spatial requirements essential for the successful completion of demonstrations and other instructional exercises associated with this course, were critical if effective presentations were to be assured.

c. Instruction, relating to both microscopic anatomy (histology) as well as gross dissection exercises, frequently required the presence of the instructor at the work station of the individual student. Access to students requiring assistance,without disturbing the efforts of students in adjoining areas,was necessary.

Furnishing of the Basic Sciences area included the installation of twelve laboratory tables which could accommodate two students per table, thus a laboratory section of twenty-four students. Each table was designed with two microscope lockers and equipped with two microscopes (three objective, oil immersion type). Other fixed equipment, included primarily an instructor's desk (actually used as a demonstration table) and wall type storage cabinets.

Additional instructional items included a variety of animal skeletons with a species range encompassing rodent, equine, and comprising also those of the canine, feline and several species of primates.

Several thousand histological slides representing both normal and pathological tissue had been indexed and were stored and available for use in the study of microscopic anatomy and pathology.

Specialized equipment required for use in several of the physiological demonstrations was retained in the Surgery Laboratory and made available in the Basic Science area as needed. These items were mentioned previously as part of the Surgical Laboratory discussion.

In addition to the courses in Mammalian Anatomy and Mammalian Physiology, previously mentioned, this area was also used for teaching General Pathology and Animal Science Seminar.

The remaining two installations on the First Floor of the Animal Science complex (see Facilities Exhibit A-V) were classified as ancillary areas; these include the Sterilization and Preparation Rooms. Both were used in a dual capacity, initially for student instruction and secondly to provide supportive services for the operation of the other teaching laboratories within the building. These rooms will be briefly discussed on an individual basis, as follows:

6. Sterilization Room

This area contains 245 sq. ft. and was originally designed and outfitted with a high vacuum autoclave to steam sterilize:

a. Surgical packs, gowns and other items used in the Surgical Assisting course.
b. Miscellaneous glassware and pipettes associated with the Hematology-Urinalysis and Parasitology courses.
c. Bacteriological media, Petri plates, saline and other items required in teaching Applied Microbiology.
d. Needles, syringes, gnotobiotic supply cylinders, water flasks and a variety of other essentials used in Laboratory Animal Science I and II, and Laboratory Animal Diseases.

As growth of the program accelerated and the profile of the curriculum changed, the singular use of this area was modified to include:

(1) The installation of a washer-dryer to launder and sanitize laboratory coats and other items of apparel used by the faculty and staff during instructional periods.

(2) The installation of a surgical table to be used for the pre-surgical work-up and preparation of animals prior to surgery. Location-wise, this area was ideal for this purpose, in that it was directly opposite the Surgical Laboratory (see Facilities Exhibit A-1).

Note: Prior to use as a surgical patient preparation area, sterilized and sanitized materials were removed. The room was thoroughly cleaned after use as a surgical preparation room.

(3) The installation of a laboratory size refrigerator for the purpose of storing selected biological reagents.

(4) Installation of cabinets, as shown in Facilities Exhibit A-V, for storage of various instructional and miscellaneous supplies.

With regard to the instructional usage of this area, each student was required to learn the operation of the autoclave and the processes relating to the steam sterilization of the various items of equipment and supplies previously mentioned. Additionally, individual students were also involved in surgical preparation procedures at least one or more times during the semester in which the Surgical Assisting course was taught.

7. Preparation Room

This area, which measures 13' x 8', was designed and equipped primarily for the following purposes:

a. Washing, preparation and hot air sterilization of selected items of glassware
b. The preparation of chemical reagents and solutions
c. Preparation and pouring of bacteriological media.

The students (with an emphasis on learning) and technical assistants (for the purpose of operational support) were involved in the various procedures just enumerated.

This facility was provided with equipment shown in Facilities Exhibit A-V, which included (in partial listing) a laboratory still for processing of distilled water, sample countertop work space and cabinet storage space for glassware. A double sink for washing glassware and a hot air oven for purposes of glassware sterilization were also included. Additional items not shown in the diagram but essential in the operation of the Preparation Room included an:

(1) Automatic blender
(2) Analytical balance
(3) Combination hot plate-stirrer
(4) Instrument sterilizer
(5) Automatic pipetter
(6) Pipette washer

All of the laboratory courses in the curriculum (clinical, surgical and laboratory animal) relied upon the utility and support provided by this ancillary area.

In concluding the discussion of First Floor facilities, it is considered important to point out, at this time, the planning-design relationships which influenced the location of the various laboratories in this area of the Animal Science Center. The rationale for placement of these installations was predicated on the basis that:

(a) The Surgery Laboratory which, in addition to surgery, was also planned for use as an animal examination and treatment room. For maximum efficiency and convenience in obtaining clinical samples (blood, urine and fecal) for pre-surgical "work-up," as well as diagnostic samples from sick animals, it was located in close proximity to the Clinical Pathology Laboratory.

(b) Both of these laboratories (just mentioned) were dependent upon the services of the Sterilization and Preparation Rooms for the preparation and sterilization of supplies, equipment and reagents.

(c) The Basic Science Laboratory, as its usage applies particularly to the coures in Mammalian Physiology, was dependent upon the physiological instrumentation and in some instances the actual use of the Surgical Laboratory in the completion of various laboratory exercises. Additionally, the General Pathology course, also being instructed in the Basic Science facility, was strategically located to procure pathological tissues from surgery and abnormal blood, urine and fecal samples from the clinical area for demonstration purposes.

Four years of operation in this facility has validated the design criteria in this instructional area.

B. Basement Floor

1. Radiographic Laboratory

This area was designed as a three room complex which included: the X-ray Exposure Area, X-ray Control Room and the Film Developing Dark Room. The entire suite encompassed 357 sq. ft. The X-ray Exposure Room measured 137 sq. ft. and the other two areas 108 sq. ft. each (see Facilities Exhibit B-1 for information on location and exact dimensions). Each of these spaces will be considered on an individual basis below (also see Facilities Exhibit B-II for room design and equipment information):

a. X-ray Exposure Room - This area was designed to include lead shielding in all four walls, the entry door and the ceiling. The wall partition separating the Exposure Room from the Control Room contained a viewing window fabricated of leaded glass. The Exposure Room was outfitted with a stationary mounted X-ray machine (200 MA - 125 KVP capacity) along with a stationary table and grid. Additional standard equipment available for use in this area included lead lined full sized aprons (shoulder to knee length) and lead lined gloves. These were essential on infrequent occasions when it became necessary to position and restrain an animal, instead of anesthetizing it prior to exposure.

Radiation film badges were also utilized by professional staff and students for safety, exposure monitoring purposes.

The design, equipment and operational aspects of the Exposure Room had been examined and approved prior to operation by the New York State Health Department.

b. X-ray Control Room - This space, separated from the Exposure Room by a lead impregnated partition containing a door and viewing window, was equipped with only the control unit of the X-ray machine. From this location, after properly adjusting the machine and positioning the animal to be radiographed, observation of the animal through the viewing port was continued until the machine was activated and the radiograph taken.

c. Film Developing Dark Room - The third room in the radiographic complex was equipped and utilized for the processing and developing of X-ray film. It was connected with the adjacent Control Room by a double door film pass-through box. The outfitting of this facility to provide for an effective film processing operation included the installation of base cabinets which were used for storage of unexposed film and as a storage library for exposed plates (retained for demonstration purposes). Essential equipment used for processing purposes included a developing tank, film dryer, wall mounted viewer, film hangers, I.D. printer, cassettes, illumination and a filtered (safe) light. (See Facilities Exhibit B-II.)

In utilizing the total Radiographic Laboratory as an instructional facility, each student was taught the fundamentals involved in:

(1) Anesthetizing and positioning animals

(2) Complete operation of the X-ray machine

(3) Processing and developing of X-ray film.

In addition to its utilization in the Anesthetic and Radiologic Techniques course, this facility was also used in conjunction with courses in Surgical Assisting, Animal Health and Clinical Management.

2. Clinical (Animal Techniques) Laboratory

The Animal Techniques Laboratory was the largest of the instructional areas located on the Basement Floor level. It encompassed 710 sq. ft. and measured approximately 27' x 28'. This installation was provided with base and wall cabinets along one wall. The base cabinets were fabricated with storage cubicles sufficient to accommodate twelve three-objective, oil immersion microscopes. The cabinet counter-top areas, plus a large centrally located table, represented instructional and work space required in all of the laboratory animal related courses.

A representation of most of the larger items of equipment used to furnish this laboratory are indicated in Facilities Exhibit B-III. A partial listing of this equipment includes a surgical (examining) table, a microbiological incubator, a regular refrigerator for the storage of biologicals, an explosion proof refrigerator for the storage of combustible materials (ether), a standard floor model centrifuge, an instrument cabinet and an upright freezer for the accumulation and preservation of animal carcasses prior to incineration or laboratory usage.

In addition, less sizable, portable types of equipment which were used on a part time basis with specialized courses during part of the academic year and placed in storage thereafter are as follows:

a. Clear plastic gnotobiotic isolator units and the ancillary equipment needed to support and maintain them.
b. Laboratory animal restraint devices
c. Animal identification equipment, including tattooing apparatus
d. Multiple sets of general surgical equipment used to perform laboratory animal (rodent) surgery
e. Analytical balance
f. Rodent scales (electric)
g. Endocrinectomy surgical equipment, including headlamps, binocular loupes, dental type drills and specialized surgical instruments.

This facility was used primarily to teach techniques and develop proficiencies related to the laboratory animal science field. Instruction ranged from fundamental procedures such as restraint, sexing, blood sampling and injections which were covered in the introductory courses; to more complex instruction in areas such as gnotobiotic (germfree) techniques and endocrine surgery (thyroidectomies and hypophysectomies in rodents) in the more advanced courses.

Various clinical procedures relating to laboratory animals were also introduced to the student as the result of courses taught in this area.

The specific curricular offerings employing the Clinical (Animal Techniques) Laboratory included Laboratory Animal Science I and II, Laboratory Animal Diseases and Animal Science Seminar.

3. Animal Vivarium

The animal vivarial area was composed of a three-room complex, with each room accessible from a common corridor (see Facilities Exhibit B-1). This facility was planned and initiated for the purpose of breeding and maintaining laboratory and companion types of animals for use in support of all laboratory courses in the Animal Science curriculum.

The design profile and outfitting of all three rooms was generally similar in that each room was equipped with minimum environmental controls (air conditioning, heating and draft free ventilation). This system, which provided only a low level of air filtration and contained no humidification controls, has nonetheless proven satisfactory for the breeding of high grade conventional quality animals used in this program. Additional design characteristics relating to the animal rooms point to the total exclusion of windows and the installation of a smooth, hard, moistureproof, easy to clean, plastic type material on the walls and ceiling areas.

The vivarial quarters (see Facilities Exhibit B-I), inclusive of the three breeding rooms and a dog-run area, encompass a total of 899 sq. ft. as indicated in the following space allocation scale:

a. Animal Room I - 15' x 19.5' = 291 sq. ft.
b. Animal Room II - 15' x 13.9' = 206 sq. ft.
c. Animal Room III - 15' x 14' = 210 sq. ft.
d. Dog Run Area (connecting with Animal Room III)
16' x 12' = 192 sq. ft.

The equipment required for this instructional facility followed an approximate format for all three rooms, with the exception of the different individual caging systems required for the various species of animals. As seen in Facilities Exhibits B-IV and B-V, each breeding area contained specialized racks and caging, a sink and receptacles for the storage of feed. In addition, a constant monitoring, temperature-humidity recorder was present in each room.

Equipment Note:

> All caging used throughout the vivarium for the maintenance of dogs, cats, rabbits and guinea pigs had to comply with the provisions of the Federal Animal Welfare Act (P.L. 89-544) passed on December 15, 1966. This Act stipulated cage sizes to be used for individual and multiple animal housing.

In the operation of the vivarium, a total of eight different species of animals were maintained on a 12-month basis, as follows:

(1) Animal Room I - contained approximately 500 mice (five strains); 250 rats (three strains); and 75-100 gerbils.

(2) Animal Room II - contained approximately 25-30 guinea pigs and 50-75 hamsters.

(3) Animal Room III - contained usually five-eight dogs; 10-15 cats and nine rabbits. The dog cages were connected to an adjoining run area through a guillotine type door at the back of the cage. This accommodation provided a means for daily exercise recommended for this species.

Although the single room-single species design concept, relating to the breeding rooms, was not overlooked, it was deemed not applicable in this situation, where the number of rooms was limited and when simultaneously (for maximum training of students) it was desirable to maintain as many different laboratory species as possible in the space provided.

In addition to providing animals for use in various courses within the curriculum, this facility was also used as a training area for students involved in the laboratory animal science courses. Laboratory animal practice exercises involved assignments of students to all breeding rooms. Practice sessions included both animal care duties and supervisory assignments.

Every laboratory oriented course within the curriculum used the vivarium for either training or support purposes, or both.

4. Cage Cleaning Area

The cage cleaning area which was also identified as an ancillary instructional facility, was operated in support of the vivarial operation. Specifically, the function of the installation related to the cleaning and reprocessing of soiled cages and other equipment used in the maintenance of animals housed in the breeding colony.

This facility, situated at the terminus of the vivarial access corridor, was (for reasons of sanitary practice) physically separated from the animal rooms (see Facilities Exhibit B-I). It was designed for location proximal to the rear ingress-egress area of the building, thus enabling efficient disposal of animal colony wastes and residues. Additionally, in order to equalize steam, humidity and moisture build-up resulting from cleaning operations, a ventilating system and several adjustable windows were installed. The inclusion of drains in the properly pitched floor dealt effectively with the elimination of floor moisture.

This area, measuring approximately 31' x 14' (457 sq. ft.) was outfitted as shown in Facilities Exhibit B-VI. A partial listing of the equipment utilized in cage cleaning and related operations included a cabinet type cage washer, a cage drying rack, bedding storage bin, feed storage cabinet and a large double sink. Due to space limitations and other factors relating to the function of this facility, a clean area-dirty area design concept, frequently recommended for cage cleaning support areas, was not possible.

An animal bathing tub was also included as an equipment item in this area. Its use was confined primarily to the periodic washing of dogs being maintained in the vivarium.

One final item of equipment located in a separate facility at the rear of the Animal Science Center and associated with both the Animal Vivarium and Cage Washing Area on a quasi basis, was the animal incinerator (crematory). This was used for the disposal of euthanized laboratory rodents, dog cadavers used in Mammalian Anatomy, and other dead animals.

Course offerings within the Animal Science curriculum which related to student training and utilization of the Cage Washing Area and Animal Crematory were Laboratory Animal Science I and II, and Laboratory Animal Diseases.

The remaining two space designations pertaining to this facility were classified as non-instructional, ancillary, support areas. Briefly, these include:

5. Locker Rooms
6. Storage Areas

both of which are indicated on Facilities Exhibit B-I.

The locker room-shower room installations provided the student with accommodations for clothes changing and showering, if desired, after completion of laboratory sessions or vivarial practice exercises.

The storage areas were utilized to maintain inventories of supplies required in laboratory courses during the academic year. They were also employed to store equipment which was used only on an intermittent basis. Finally, the storage room located adjacent to the stairwell area was designated for the maintenance of embalmed dog cadavers used in Mammalian Anatomy during one term of the school year. This room was fitted with a window ventilating fan to disperse the formaldehyde odor eminating from the cadavers.

Spatial design relationships which were discussed relevant to the First Floor of the Animal Science Center also exist on the Basement Floor level as follows:

(a) The Radiology and Clinical (Animal Techniques) Laboratories, both of which were extremely dependent on laboratory animal availability, were located in close proximity to the Vivarial Area.

(b) The vivarial operation, which required the support of the Cage Preparation Area for the cleaning and processing of ancillary supplies, was located adjacent to this facility.

(c) Locker Rooms and Storage Areas were convenient to all instructional laboratories and animal breeding rooms.

(d) The animal crematory was located at the rear of the building, but conveniently close to the animal laboratories and the vivarium.

C. Supplemental Facility

In addition to the Animal Science Center, which served as the primary instructional area for laboratory related Animal Science courses, a supplemental facility used marginally in this curriculum was the Delhi College Farm. The Farm operation consisted of the breeding and maintenance of a pure-bred Holstein dairy herd, a small beef cattle herd, several riding horses and a small herd of sheep. These domestic species were used on a limited basis in the teaching of courses in Animal Health, Animal Parasitology, Horse Management, Hematology and Urinalysis and Applied Microbiology.

II. Special Instructional Materials

In the discussion of Animal Science instructional facilities, just completed, an attempt was made to identify the essential items of technical equipment required for effective teaching in each laboratory area and to justify the utilization of this equipment in terms of individual courses within the curriculum.

To complement the facilities and specialized equipment available and to further expand the learning experience of the student, certain instructional materials not previously emphasized in a teaching context have been evaluated as particularly effective in conceptualizing the laboratory procedures and techniques being introduced.

A selective representation of teaching resources classified as Special Instructional Materials have been categorized into three primary classifications, namely Audio-visual Systems; Laboratory, Companion and Domestic Animals; Preserved Specimens and Models; these are reviewed as follows:

1. Audio-visual Systems - This resource represented one of the most extensive and generally used supplements to instruction associated with the Animal Science curriculum. A wide range of films were available (many on a no-cost basis from government and industry sources) which were excellent in augmenting regular instruction material. The use of films and other audio-visuals was particularly important where difficult to explain concepts were involved, or when experiments or procedures were (due to lack of time, space or equipment) not reproducible in Animal Science laboratory sessions.

   In addition, film strips, 35 mm slides, overhead projectiles, and audio and video tapes were also effectively used to promote a maximum learning experience for the student. Frequently, when supplements of the type just mentioned were not available, or did not reflect the desired emphasis, Animal

Science staff members individually, or in conjunction with the College Instructional Resources Department, prepared materials for classroom presentation.

The most notable example of departmentally produced audio-visuals occurred in response to the need for supplemental materials in the Surgical Assisting course. This requirement resulted in the video taping of a series of fifteen different surgical procedures which emphasized the duties and responsibilities of the surgical assistant during a variety of both basic and complex surgical procedures. This series was planned, programmed and completed by a member of the Animal Science veterinary staff.

Other departmental teaching materials prepared as the result of inavailability of appropriate materials from commercial sources included 35 mm slides, overhead projections, audio tapes and sound on slide presentations.

Some of the specialty equipment required in preparation and presentation of these resource materials was available within the Animal Science Department. A partial listing follows:

a. Closed circuit television system, including
   TV camera, monitor and viewing console
b. Camera equipment (35 mm)
c. Movie projectors
d. Tape recorders

e. Slide projectors
f. Sound on slide projectors
g. Photocopy machine

Additional equipment, services and consultation, when needed, was provided by the College Instructional Resources Department.

2. Laboratory, Companion and Domestic Animals

Instruction in most laboratory related courses representing this curriculum was dependent upon the use of animals, or clinical samples obtained from animals, housed in the Animal Science Vivarium and College Farm. Proficiencies in the multitude of basic and advanced laboratory research techniques taught in Laboratory Animal Science I and II and Laboratory Animal Diseases could not have been developed without the use of the various animal species available for this purpose. Instruction in Surgical Assisting and Anesthetic and Radiologic Techniques was contingent upon the utilization of canine and feline animals, as well as selected rodent species. The majority of samples of blood, urine, fecal material and milk to be processed in the Hematology and Urinalysis, Animal Parasitology, and Applied Microbiology laboratory exercises were obtained from animals housed in the Animal Vivarium and at the College Farm. Breeding studies and laboratory animal practice exercises could not have been included in the curriculum without the availability of animals.

3. Preserved Specimens and Models

A more applied and comprehensive approach was possible in the establishment of a basic science background by the use of canine cadavers (dogs which were euthanized, enbalmed and circulatory system injected - veins blue, arteries red) in the Mammalian Anatomy course. Systematic dissection of these animals (two students per dog) provided an in-depth understanding of tissues, organs and systems relationships which would otherwise not have been possible. Muscles and other tissues involved in injection procedures, veins utilized in blood sampling, as well as other anatomical areas and sites of major significance, received emphasis as the result of utilizing these specimens.

Skeletal models were also employed effectively in the study of gross and comparative osteology relating to the Mammalian Anatomy course. Rodent, canine, feline, equine and primate skeletons were available for this purpose.

Formalin preserved intestinal helminths and whole mount plastic models of a variety of internal and external parasite species served to amplify the understanding and approach to taxonomy and identification in the Animal Parasitology course.

Additional information relating to instructional resources employed in the presentation of the Animal Science curriculum are briefly alluded to in Chapter II, Item 10.

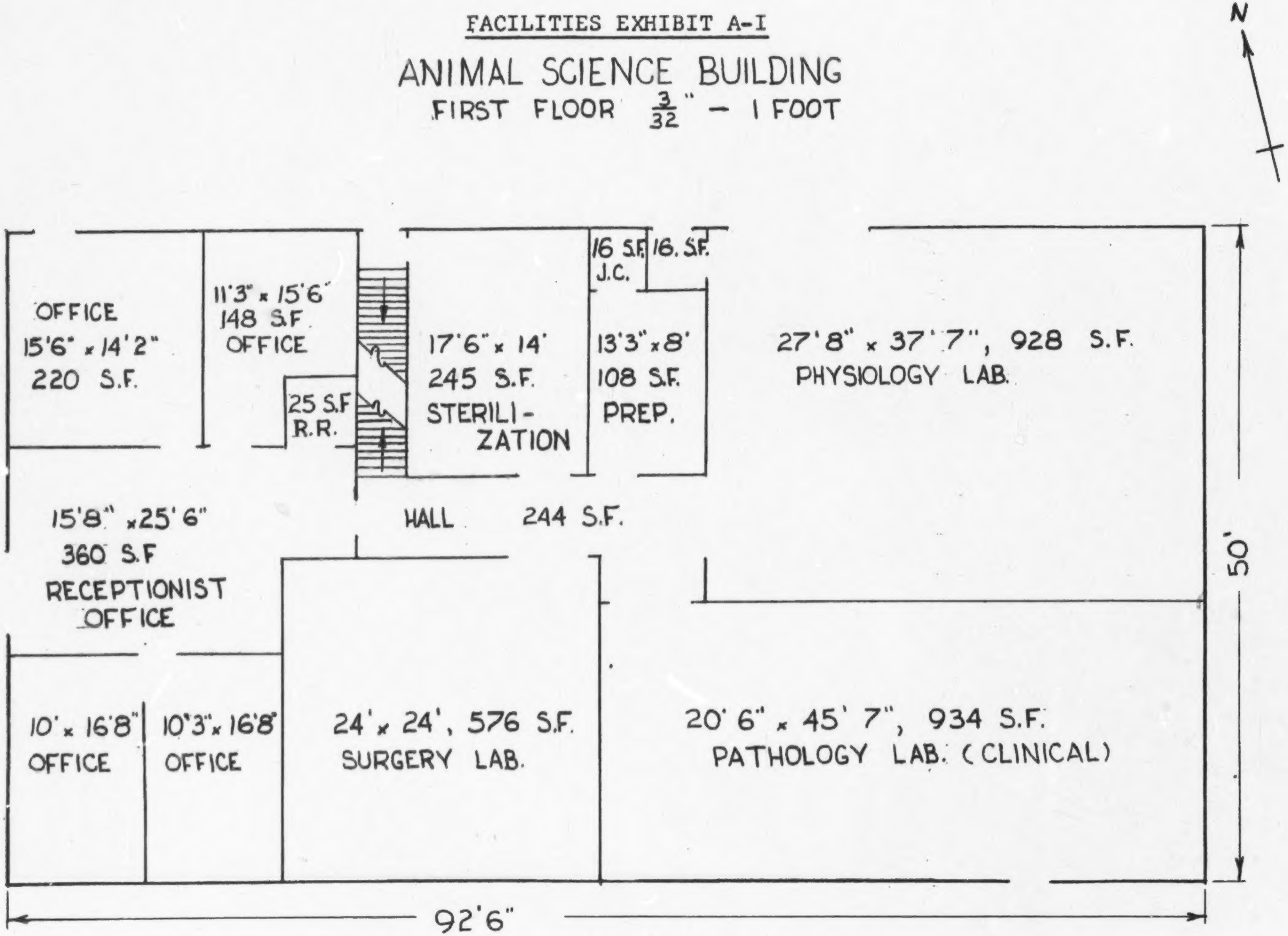
In concluding this chapter, it should be pointed out that a more complete understanding of the application of equipment, facilities and instructional materials in this program can be attained by examining the detailed course outlines of the Animal Science curriculum presented in Volume II.

Finally, a detailed composite listing of essential equipment procured and utilized in this program is presented in Chapter VIII, Appendix C of this volume.

FACILITIES EXHIBIT A-I

ANIMAL SCIENCE BUILDING

FIRST FLOOR $\frac{3}{32}$" – 1 FOOT


N
OFFICE
15'6" × 14'2"
220 S.F.
11'3" × 15'6"
148 S.F.
OFFICE
25 S.F
R.R.
17'6" × 14'
245 S.F.
STERILI-ZATION
16 S.F.
J.C.
16. S.F.
13'3" × 8'
108 S.F.
PREP.
27'8" × 37'7", 928 S.F.
PHYSIOLOGY LAB.
15'8" × 25'6"
360 S.F
RECEPTIONIST OFFICE
HALL 244 S.F.
10' × 16'8"
OFFICE
10'3" × 16'8"
OFFICE
24' × 24', 576 S.F.
SURGERY LAB.
20'6" × 45'7", 934 S.F.
PATHOLOGY LAB. (CLINICAL)
50'
92'6"

FACILITIES EXHIBIT A-II

SURGERY ROOM

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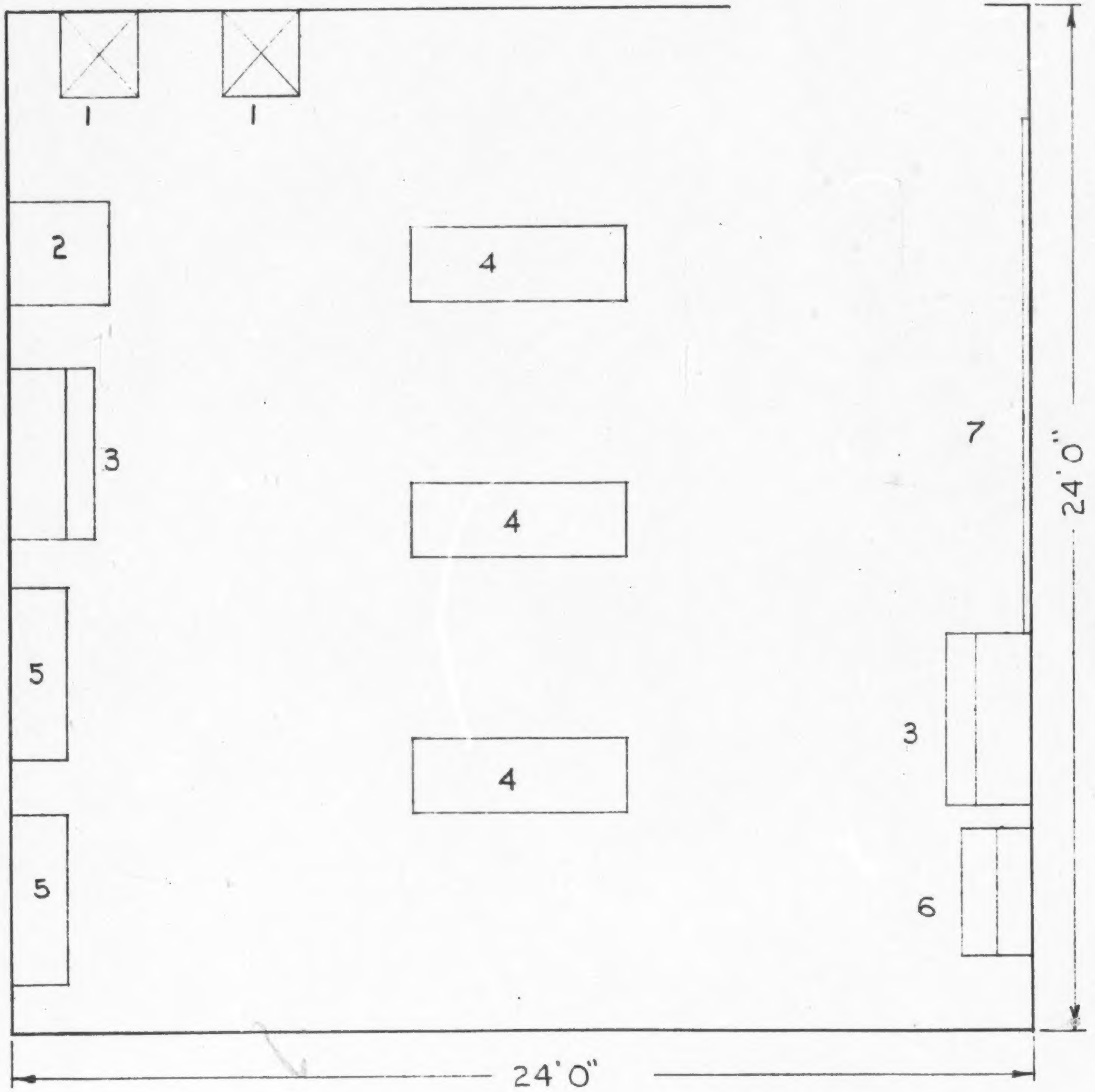

1 SURGEONS SINK
2 REFRIGERATOR
3 COMBINATION STORAGE CABINETS
4 OPERATING TABLES
5 WALL STORAGE CABINET
6 DRUG & SUPPLY CABINET
7 BLACK-BOARD

]

FACILITIES EXHIBIT A-III

CLINICAL PATHOLOGY LABORATORY

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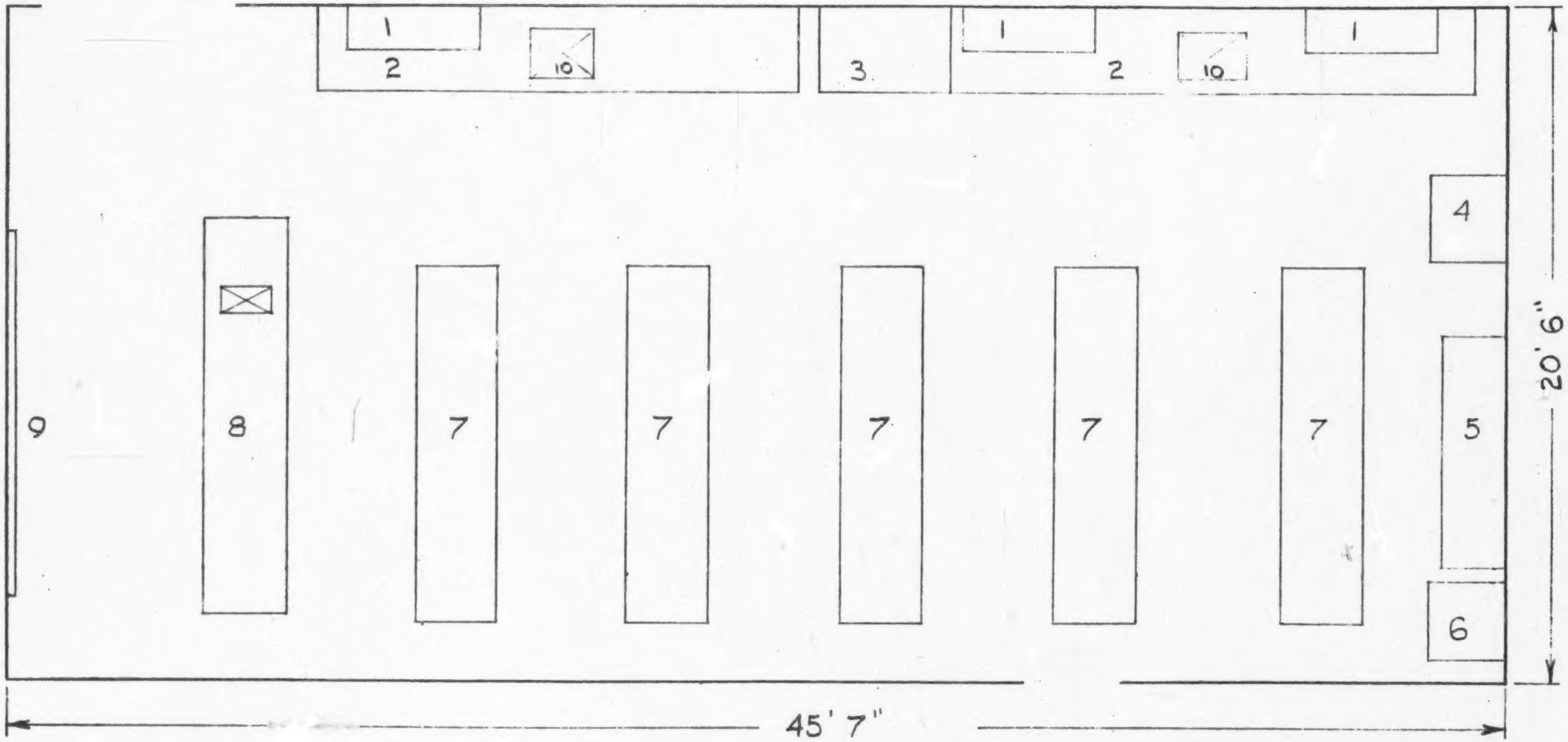
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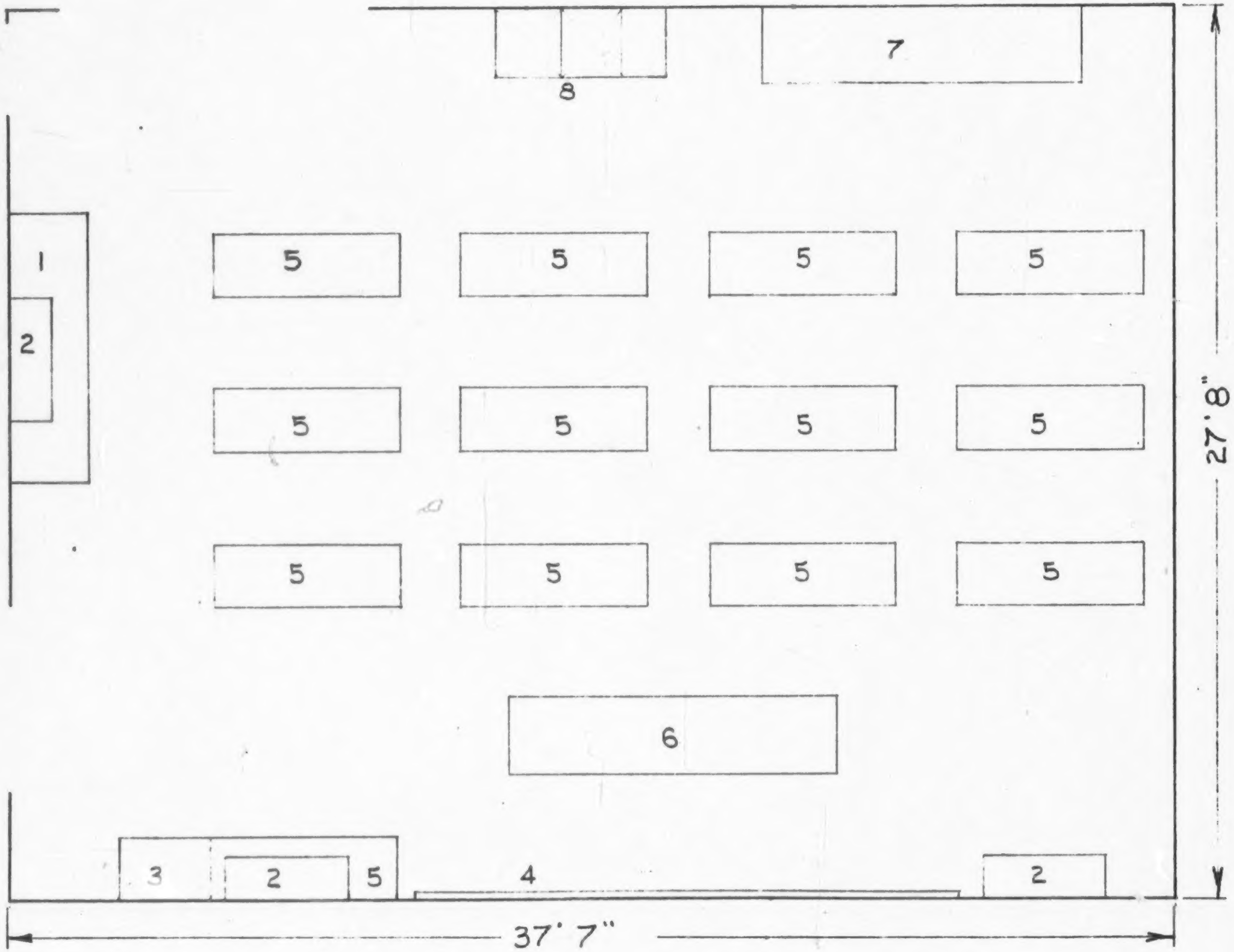
7
20' 6"
45' 7"

1 STORAGE CABINET
2 WALL STORAGE CABINET WITH COUNTER
3 INCUBATOR, BIOLOGICAL
4 FREEZER
5 TABLE
6 REFRIGERATOR
7 STUDENT SCIENCE DESK, 4-PLACE
8 INSTRUCTOR SCIENCE DESK
9 BLACK-BOARD
10 SINK

FACILITIES EXHIBIT A-IV

ANATOMY & PHYSIOLOGY LABORATORY

$\frac{1}{4}$ INCH = 1 FOOT


7
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6
3
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5
4
2
27' 8"
37' 7"

1 WALL TABLE
2 STORAGE & DISPLAY CABINET
3 MICROSCOPE STORAGE CABINET
4 BLACKBOARD
5 STUDENT SCIENCE DESK
6 INSTRUCTOR SCIENCE DESK
7 WALL CABINET WITH COUNTER TOP
8 SINK WITH DRAIN BOARD

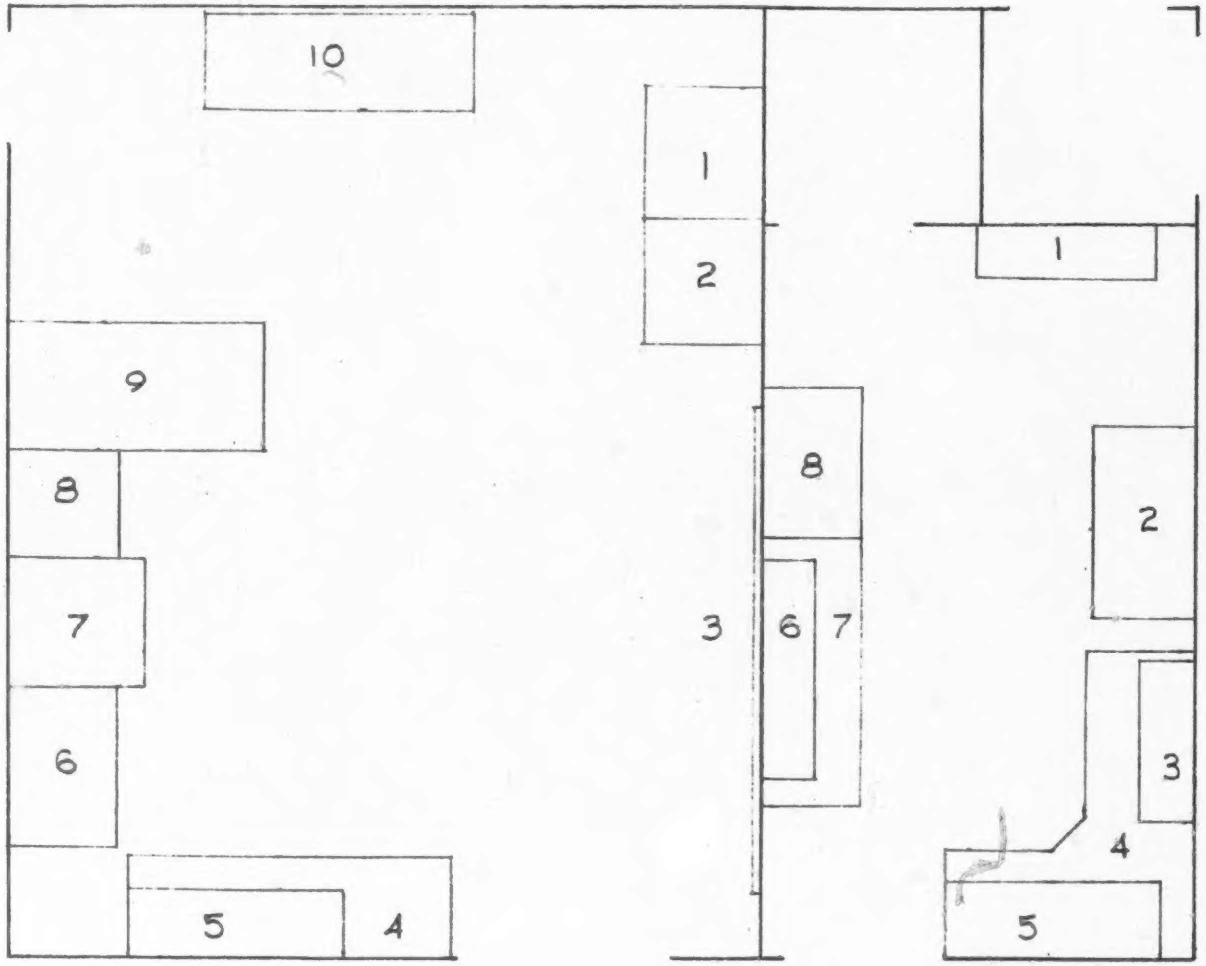
FACILITIES EXHIBIT A-V

STERILIZATION & PREPARATION ROOMS

$\frac{1}{4}$ INCH = 1 FOOT

STERILIZATION ROOM

1 WASHER
2 DRYER
3 BLACK-BOARD
4 COUNTER
5 CABINET
6 STORAGE CABINET
7 SLIDE STORAGE CABINET (2×2)
8 BIOLOGICAL REFRIG
9 AUTOCLAVE
10 OPERATING



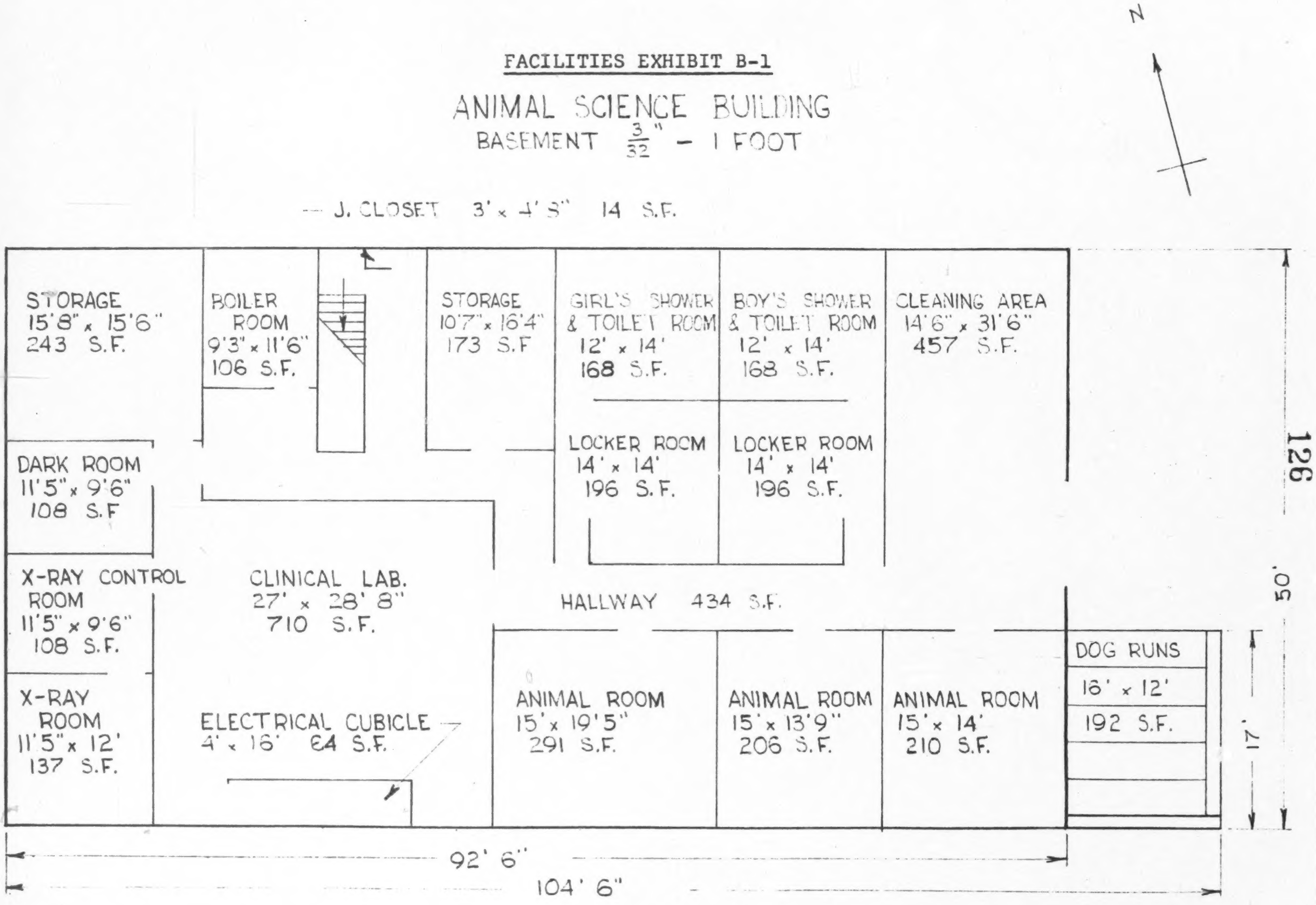
PREPARATION ROOM

1 WATER STILL
2 SINK
3 CABINET
4 CABINET ϖ COUNTER TOP
5 CABINET
6 CABINET
7 OPERATING TABLE
8 HOT-AIR OVEN

FACILITIES EXHIBIT B-1

ANIMAL SCIENCE BUILDING

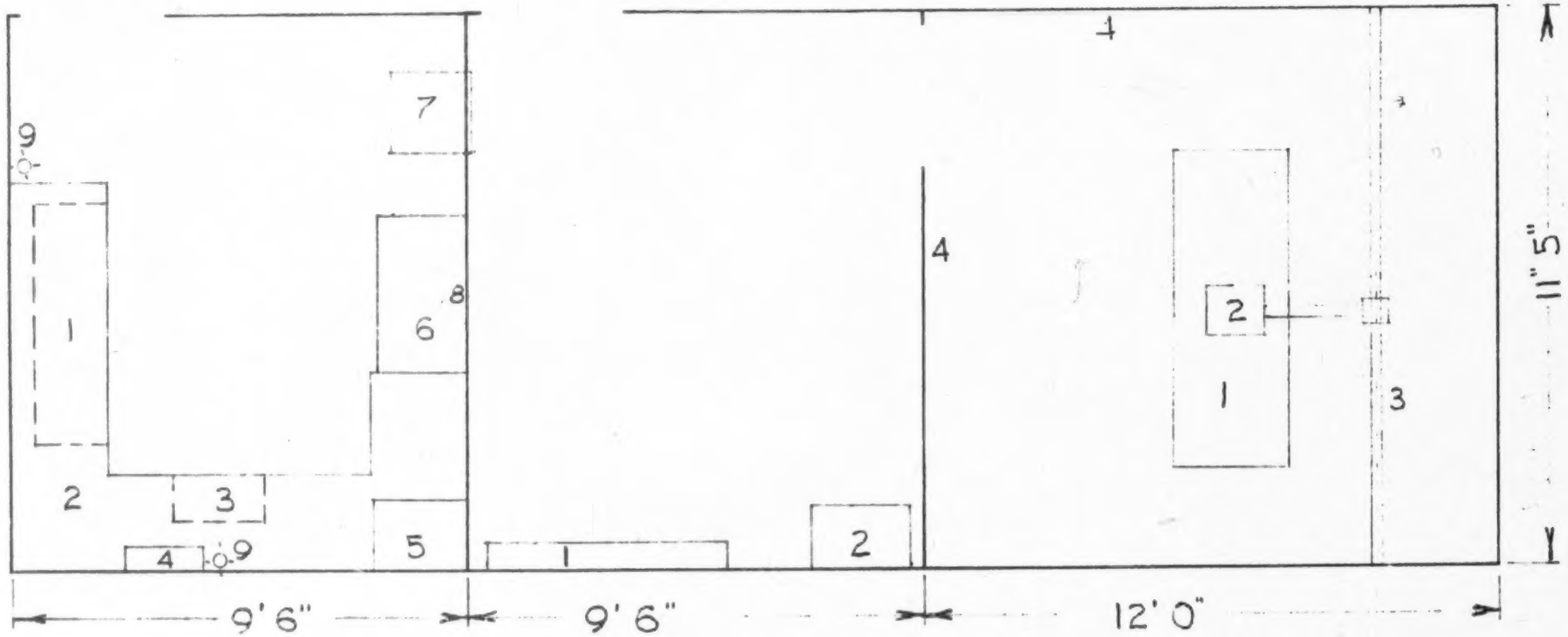
BASEMENT $\frac{3}{32}$" - 1 FOOT


N
— J. CLOSET 3' x 4' 8" 14 S.F.
STORAGE 15'8" x 15'6" 243 S.F.
BOILER ROOM 9'3" x 11'6" 106 S.F.
STORAGE 10'7" x 16'4" 173 S.F
GIRL'S SHOWER & TOILET ROOM 12' x 14' 168 S.F.
BOY'S SHOWER & TOILET ROOM 12' x 14' 168 S.F.
CLEANING AREA 14'6" x 31'6" 457 S.F.
DARK ROOM 11'5" x 9'6" 108 S.F
LOCKER ROOM 14' x 14' 196 S.F.
LOCKER ROOM 14' x 14' 196 S.F.
X-RAY CONTROL ROOM 11'5" x 9'6" 108 S.F.
CLINICAL LAB. 27' x 28' 8" 710 S.F.
HALLWAY 434 S.F.
X-RAY ROOM 11'5" x 12' 137 S.F.
ELECTRICAL CUBICLE 4' x 16' 64 S.F.
ANIMAL ROOM 15' x 19'5" 291 S.F.
ANIMAL ROOM 15' x 13'9" 206 S.F.
ANIMAL ROOM 15' x 14' 210 S.F.
DOG RUNS 16' x 12' 192 S.F.
50'
17'
92' 6"
104' 6"

FACILITIES EXHIBIT B-II

RADIOGRAPHIC ROOMS

$\frac{1}{4}$"-1 FOOT



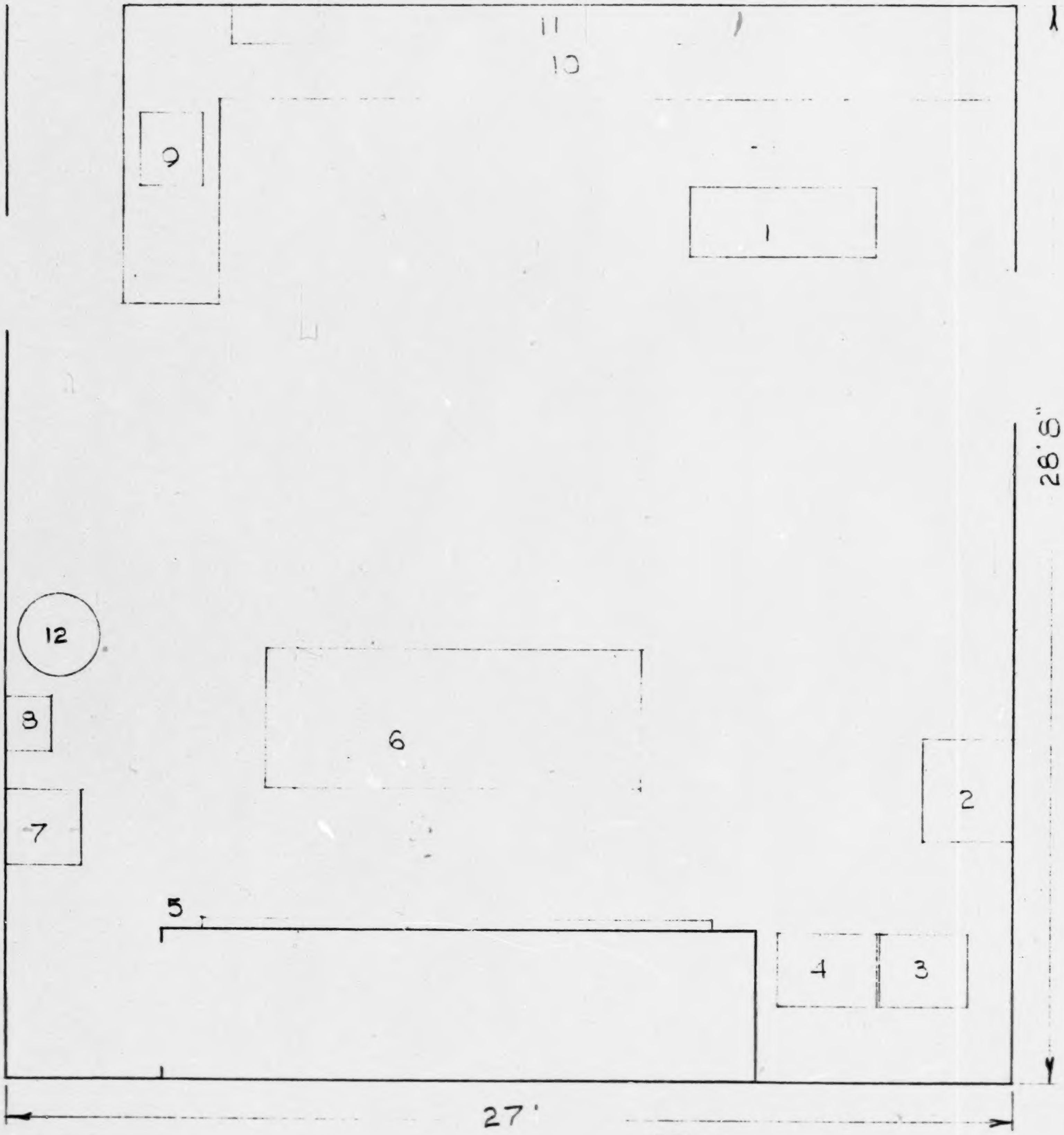
DARK ROOM
1 X-RAY STORAGE
2 COUNTER
3 FILM STORAGE BIN
4 VIEWER
5 X-RAY DRYER
6 DEVELOPING TANK
7 PASS-THRU BOX
8 SAFE LIGHT & VIEWER
9 SAFE LIGHT

CONTROL ROOM
1 X-RAY VIEWER
2 CONTROL PANEL

X-RAY ROOM
1 X-RAY TABLE
2 X-RAY UNIT
3 TRACK FOR X-RAY UNIT
4 LEADED WALL

FACILITIES EXHIBIT B-III

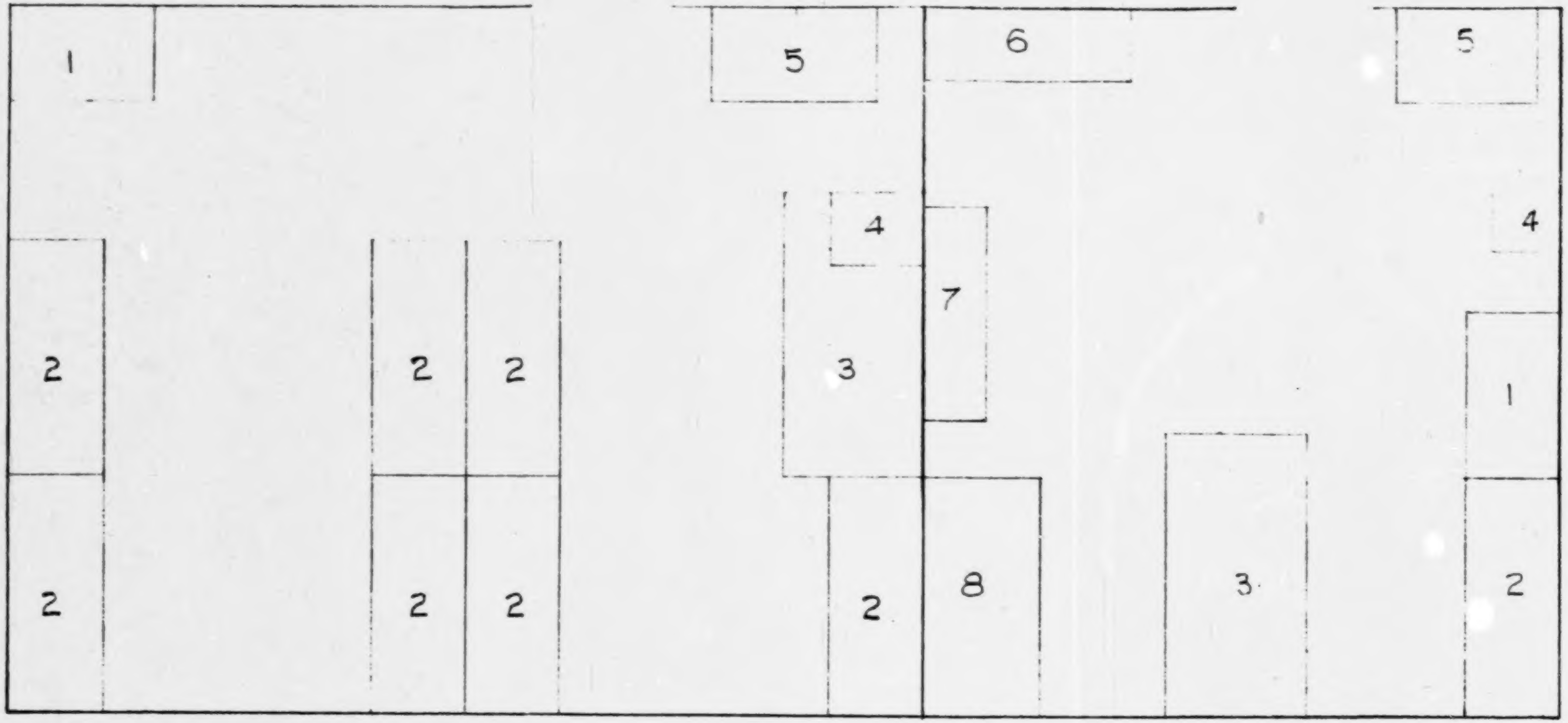
CLINICAL LAB.
$\frac{1}{4}$ INCH = 1 FOOT



1 OPERATING TABLE
2 INCUBATOR, MICRO
3 REFRIGERATOR
4 FREEZER
5 BLACKBOARD
6 TABLE
7 EXPLOSION PROOF REFRIG.
8 INSTRUMENT CABINET
9 SINK
10 COUNTER
11 CABINETS
12 CENTRIFUGE

ANIMAL ROOMS 1 & 2

$\frac{1}{4}$ INCH – 1 FOOT



ANIMAL ROOM NO. 1

1 FEED BIN
2 ANIMAL CAGE RACKS
3 TABLE
4 SCALES
5 SINK

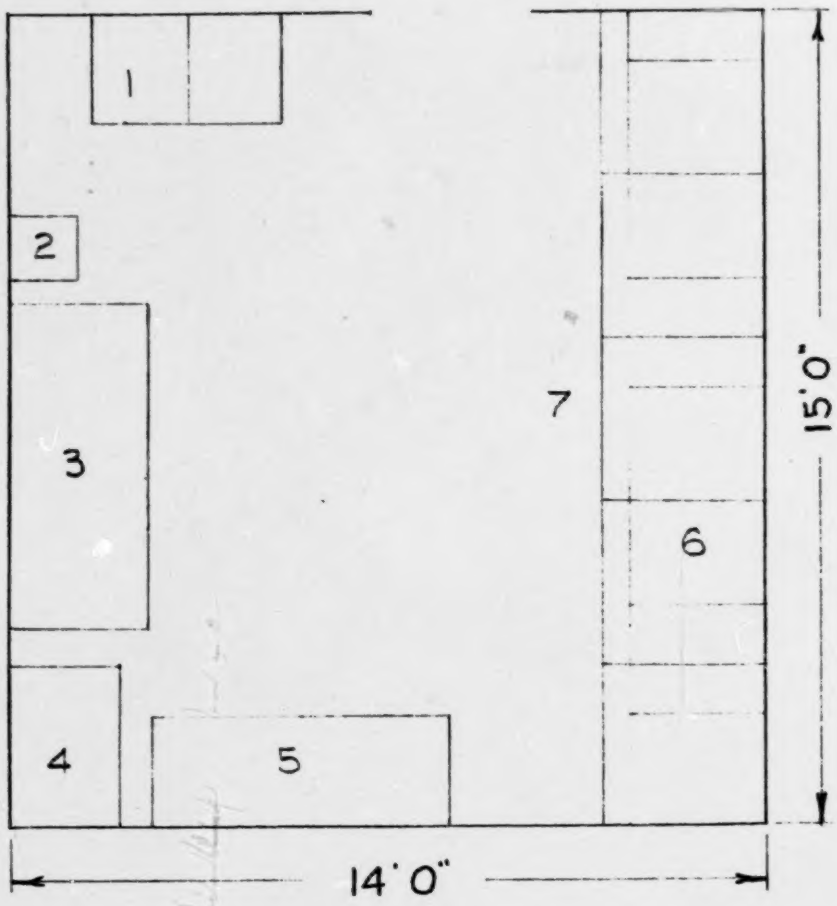
ANIMAL ROOM NO. 2

1 GUINEA PIG BREEDING CAGE UNIT
2 ANIMAL CAGE RACK
3 TABLE
4 FOOD BIN
5 SINK
6 HANGING CAGES & RACK
7 GUINEA PIG CAGE UNIT
8 METABOLISM CAGE

FACILITIES EXHIBIT B-V

ANIMAL ROOM NO. 3

$\frac{1}{4}$ INCH = 1 FOOT

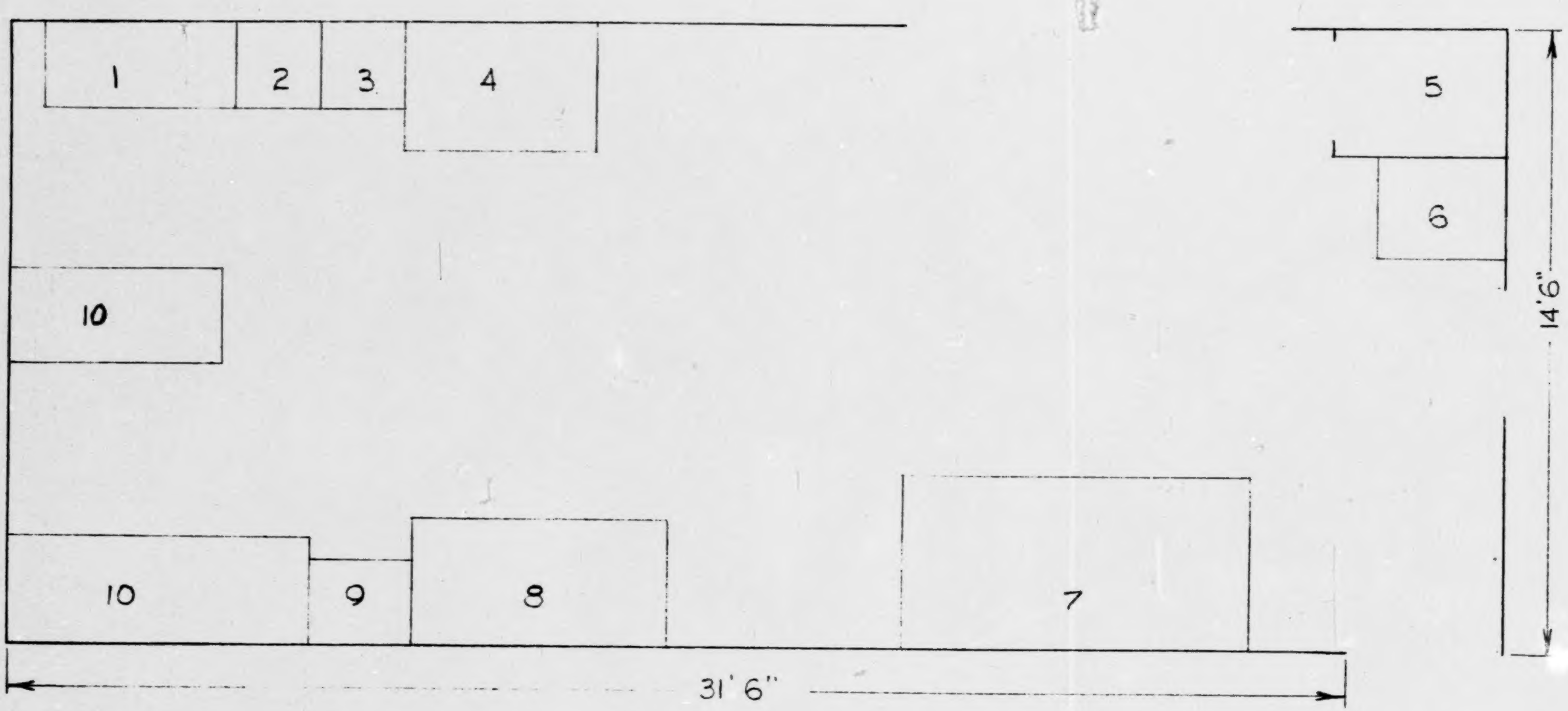


1 SINK
2 FEED BIN
3 CAT & DOG CAGE UNIT
4 FEED BIN
5 RABBIT CAGE UNIT
6 CAT CAGES (7)
7 DOG CAGES (5)

FACILITIES EXHIBIT B-VI

CLEANING AREA

$\frac{1}{4}$ INCH = 1 FOOT



1 ANIMAL WASH TUB
2 SINK
3 SINK
4 CAGE WASHER
5 JANITOR CLOSET
6 DOG RECOVERY CAGE
7 SHAVINGS BIN
8 FEED STORAGE CABINET
9 REFRIGERATOR
10 CAGE DRYING RACK

CHAPTER IV

THE CURRICULUM

I. Introduction

The Animal Science Technology curriculum was initiated and developed for the purpose of providing the qualified student with a two year, career oriented education in the animal science professional field. This program, through a combination of technical specialty courses and general education offerings prepared the individual for employment as a technician in a cluster of positions relating to the laboratory animal research and veterinary assisting career areas.

Through the realization of established goals and objectives associated with this curriculum, graduates of the program have begun to respond to the increasing demand for trained paraprofessional personnel required by biomedical laboratories and the veterinary profession.

According to interim evaluation reports received from professional employers, the performance effectiveness of graduates classified in a variety of animal science employment situations ranged, in the majority of instances, from above average to superior.

Curricular adjustments in response to continuous evaluation have contributed to the increased effectiveness of the instructional program. Another extremely significant factor that enabled the quality of the program to increase was the highly motivated caliber of student involved in it. Even though a "rolling admissions process" (see Chapter II, Part 2) was used in selecting entrants for this and other technical programs at this College, the academic and personal profiles of Animal Science applicants selected for admission during the period covered by this report were unique. The most obvious differences were noted as follows:

1. The New York State Regents Scholarship Examination scores of Animal Science applicants (used as criteria for college entrance for New York State students) averaged 15 to 20 points higher than the average for the total College. Scores from college entrance examinations, other than the RSE which were taken by non-resident applicants, were also proportionately higher.
2. Animal Science applicants were evaluated as extremely goal-oriented, highly ethical, motivated individuals.
3. The average Animal Science applicant expressed a basic affection and humane feelings toward animals.

It is also interesting to note that the proportion of male to female participants in this program has been randomly established at approximately a two to one ratio in favor of the female student.

As far as the general academic requirements at this College were concerned, the Animal Science student had to comply with a structured schedule, designed as follows:

1. The academic year was delineated on a term basis, with each term consisting of eleven weeks of classes.
2. The school week was structured on a five and one-half day basis, with classes scheduled from 8:00 a.m. until 5:00 p.m. Monday through Friday and from 8:00 a.m. until noon on Saturday.
3. The student load, which was intentionally designed to be less during the freshman year, usually averaged seventeen or more hours per term for the entire six terms (two years) of the program. This required that the average student spend approximately fifty hours per week for academic purposes, including lecture and laboratory periods, outside studies and library reference work.

The basic College requirements for the Associate in Applied Science degree included earning a minimum of ninety-six total credit hours, thirty-two of which encompassed courses in general education.

Specific academic requirements which had to be met prior to the awarding of the degree included:

1. Completion of the specific course obligations in the curriculum specified (in this case Animal Science) including the following course categories in general education:
   a. English . . . . 9 credit hours
   b. Mathematics and Science . . . . . 9 credit hours

c. Social Science . . . . 9 credit hours

d. Additional hours in any of the three fields listed above . . . . 3 credit hours

e. Physical and Health Education . . 2 credit hours

2. The earning of twice as many honor points as the number of credit hours taken (equal to a "C" average).

3. Compliance with special requirements of the division in which enrolled (in this case the Agricultural Division required all students to enroll and earn a passing grade in Introductory Animal Science, a first term course, and Divisional Seminar, a sixth term course - see Curriculum Model IV - Chapter II, Part 5).

Extensive consideration will be given later in this chapter to the specialized Animal Science courses comprising this curriculum.

II. Curricular Philosophy

One of the most influential factors underlying the growth, development and success of the Animal Science program was the philosophical base on which it was established. The primary objective of this curriculum was to prepare the student through academic training and skills development for paraprofessional employment in the animal science career field. The departmental credo was perhaps more encompassing, in that it included "attempting to prepare the student for life as well as *for work*." It was sincerely believed that a meaningful and complete education in Animal Science involved not only with the teaching of scientific facts and laboratory skills, but also was concerned with the development of the human characteristics of each student. Achievement and success, the ability to contribute, whether on the job or in the community, is inseparably linked to the ability of the individual *to adapt*, *to reason*, *to trust*, *to cooperate and work together*, and *to establish a set of human standards and values to work and live by*.

In attempting to accomplish the goals and objectives of the Animal Science program, the present philosophy was emphasized through both the curriculum and the efforts of the departmental staff in various ways, the most significant of which are enumerated as follows:

1. Curricular developments and modifications since the program was initiated in 1961 resulted in an almost complete departure from the original "prototype" curriculum. From an emphasis on agricultural and dairy science oriented courses, a gradual redirection in the objectives of the program had resulted in three major curricular revisions over a period of approximately five years, all of which were directed toward an increasing specialization in laboratory research and veterinary science related courses (see Chapter II, Part 5 - Curriculum Models I - IV). The last, and perhaps the most important

of these revisions, occurred in 1969 and resulted in the formation of two option areas within the same curricular framework, these included Laboratory Animal Technology and Veterinary Assisting Technology (see Curriculum Model IV).

This new curriculum provided the student (after completion of basic science and clinical techniques core courses) with the choice of either specializing and receiving indepth training in one specific option area, or preparing for a cluster of employment opportunities through the selection of a series of courses which would provide competence in both options.

2. The laboratory segment of all courses with a lecture-laboratory sequence was always organized to include laboratory sections of limited size. Even though the use of this method resulted in duplicating or replicating the same exercise (in large classes as many as five times per week), the departmental attitude decreed that there was no substitute for small sections, with limited students, to maximize the effectiveness in teaching clinical and animal related techniques. In this type of learning environment, the instructor was able to monitor and assist immediately and as needed in skills development procedures. Auto-tutorial systems have not been ignored as a means of augmenting instruction in this

program, however, many of the techniques (both clinical and animal related) for proper development, required observation, evaluation and feedback from the instructor, frequently during the laboratory period. It has been the decision of the professional staff of the Animal Science Department that to humanize and conceptualize the learning experience there must be an effective instructor-student relationship, particularly in technical, skills development type programs.

3. Through the use of a wide variety of instructional resources and methods, a continuous effort was made to impart application and meaning into both lecture and laboratory sessions. The use of guest lecturers from the research and veterinary professions, relevant audio-visual materials, demonstrations and many other resources are used to dimensionalize instruction and promote learning. Laboratory practice exercises, using Animal Science Center vivarial and clinical facilities in a manner which simulated employment conditions proved to be extremely effective. Field trips to commercial laboratory animal breeding complexes, State Health Department facilities, medical and pharmaceutical laboratories, as well as to veterinary hospitals, were enthusiastically received and evaluated affirmatively by the student.

4. Due to the close relationship of the Animal Science program and its graduates to the medical and veterinary professions, a continuous effort was exerted by the departmental staff throughout the entire two years of the program to stress the importance of professionalism and ethics as they relate to these career fields.
5. Each student enrolled in the Animal Science program was assigned one of the members of the departmental professional staff as a faculty advisor. An effort was made to establish a bond of confidence and rapport within the advisor-student relationship. Frequent counseling, preferably on an informal basis, was invited and proved beneficial to the student attempting to adjust to college life or trying to solve academic and, in some cases, personal problems.

   Advisement relating to job opportunities, and institutions at which to apply for further education was often provided. Personal recommendations on behalf of the student were also furnished by the faculty advisor.

As a general statement, it could be said that faculty advisors and other staff members alike attempted to recognize the student as an individual and to contribute in a supportive manner to each one, toward successful completion of the requirements of the academic program.

Finally, as a result of the philosophical base upon which the Animal Science program was built, added to the resultant effectiveness of the curriculum and the commitment of the departmental professional staff, it has been demonstrated by seven classes of graduates from this curriculum that:

1. The program of training has proven to be academically and technically complete. Immediately productive performance in a cluster of entry level employment positions representative of the biomedical research and veterinary assisting fields has been routinely and continuously demonstrated.
2. The comprehensive technical training, coupled with varying amounts of experience has enabled the acceptance of increased responsibility, frequently at the supervisory level.
3. The quality of training received in this program has been sufficient, not only to enable continued study, but has motivated the graduate to obtain additional education within the Animal Science field and/or related academic areas. This was demonstrated by the fact that 30-40% of the graduates of this program (thus far) have sought additional education.

III. Curricular Development

The developmental aspects of the Animal Science curriculum covering the period from 1961-1969 were previously discussed in Chapter II, Part 5 of this document. A Curricular Model Series was also included as part of that section to demonstrate the various stages through which the curriculum evolved prior to becoming established in its present form.

IV. Brief Course Descriptions

As a means of further elaborating the existing curriculum which has been designed and endorsed by the professional staff and is presently in use in the Animal Science Technology instructional program, the following exhibits have been included in this section of the report as follows:

a. Curricular Model IV - (identical to page 54, Chapter II) - reinsertion of this Curricular Model is intended to provide a point of reference for the following brief course descriptions.

b. Brief Course Descriptions.

CURRICULUM MODEL IV

ANIMAL SCIENCE TECHNOLOGY CURRICULUM (1969)

FIRST YEAR

FIRST TERM	Credit Hours
Introductory Animal Science	3
Medical Terminology	1
Freshman Mathematics	3
General Microbiology	4
Introductory Chemistry	3
Physical Education I	1
	15

SECOND TERM	Credit Hours
Mammalian Anatomy and Histology	5
Zoonoses	3
English Composition I	3
Introductory Sociology	3
Physical Education II	1
	15

THIRD TERM	Credit Hours
Animal Reproduction	3
Clinical Management	3
Mammalian Physiology	4
Applied Microbiology	4
Introductory Psychology	3
	17

SECOND YEAR

FOURTH TERM	Credit Hours
Anesthetic and Radiologic Techniques	3
Animal Parasitology	3
Laboratory Animal Science I	4
English Composition II	3
Health I	1
Selected Animal Science Elective Courses	(+)
	14 (+)

FIFTH TERM	Credit Hours
Animal Nutrition	3
General Pathology	3
Hematology & Urinalysis	3
Introductory Economics	3
Selected Animal Science Elective Courses	(+)
	12 (+)

SIXTH TERM	Credit Hours
Animal Science Seminar	1-3
Genetics	3
English Composition III	3
Selected Animal Science Elective Courses	(+)
	7-10 (+)

ANIMAL SCIENCE ELECTIVE COURSES

Laboratory Animal Option	
Laboratory Animal Science II	4
Laboratory Animal Diseases	3
Technical Reporting	1

Veterinary Assisting Option	
Animal Health	3
Surgical Assisting	2
Veterinary Science	3

UNCLASSIFIED ELECTIVES (Either Option)	
Food Sanitation & Inspection	4
Histological Techniques	2
Horse Management	3

BRIEF DESCRIPTIONS OF CORE COURSES
REQUIRED FOR BOTH THE
LABORATORY ANIMAL OPTION AND VETERINARY ASSISTING OPTION
OF THE ANIMAL SCIENCE TECHNOLOGY PROGRAM

FIRST TERM

INTRODUCTORY ANIMAL SCIENCE CREDIT HOURS: 3

A course designed to introduce the student to the terminology, technology, and specializations of the animal science curriculum. The course includes areas of information pertaining to the different classifications and breeds of animals, future employment possibilities, as well as basic scientific concepts regarding agriculture in general. The laboratory aspect of this course includes demonstrations of procedures and techniques relating to large animals, companion (pet) animals and laboratory animals. Intended to provide a basic background in animal science which will be of benefit in other courses.

MEDICAL TERMINOLOGY CREDIT HOURS: 1

An introductory course designed as a general orientation to the language of the biomedical-veterinary field. The study involves the derivation of medical terms, special rules and conventions necessary in their use, as well as the specific definition or meaning of the more commonly used medical terms. Terminology practice exercises intended to provide usage situations for new vocabulary terms are also completed as part of the course requirement.

FRESHMAN MATHEMATICS CREDIT HOURS: 3

An introductory course which provides the student with a background in mathematics sufficient to relate to the technical courses in this curriculum. Fundamental concepts relating to real number systems, properties of numbers, laws of exponents, linear equations and application of algebraic techniques to solution of word problems are established.

GENERAL MICROBIOLOGY CREDIT HOURS: 4

An introductory course in microbiology which provides the student with information relative to the characteristics of bacteria, protozoa, fungi and viruses, particularly as they concern man's environment. Laboratory emphasis is placed on the development of techniques pertaining to culture methods, identification and biochemical activities of selected microbial species.

INTRODUCTORY CHEMISTRY CREDIT HOURS: 3

An introductory course designed to acquaint the student with the language of chemistry, its symbols and fundamental mathematical relationships. Laboratory emphasis is placed on the development of skills which are needed to obtain an empirical understanding of chemistry and to relate it to the animal science oriented courses.

SECOND TERM

MAMMALIAN ANATOMY AND HISTOLOGY — CREDIT HOURS: 5

A course designed to provide an applied systematic study of gross and microscopic anatomy of the mammalian organ system using the canine as the representative species. Familiarity with basic and comparative mammalian structure is obtained through detailed laboratory dissection of the canine model and other selected species. A microscopic study of basic tissues and organs, using prepared histological sections, is also included in the laboratory section of this course.

ZOONOSES — CREDIT HOURS: 3

The communicability of infectious diseases having zoonotic, as well as public health implications, is discussed. The epidemiological characteristics of these diseases, along with information relating to the etiology, pathogenecity and recommended control of each is covered. Special consideration is given to diseases of laboratory animals which are a hazard to human health.

ENGLISH COMPOSITION I — CREDIT HOURS: 3

A fundamental study of the characteristics and uses of description, narration, definition, and process with frequent writing exercises aimed at the control of structure and meaning. Emphasis throughout on problems of reasoning: logic fallacies, fact/opinion distinctions, modes of inference, and kinds and methods of argument.

INTRODUCTORY SOCIOLOGY CREDIT HOURS: 3

The principles and methodology of sociology with an emphasis on the social problems of contemporary man in Western society. Problems to be examined in depth will be race relations, the urban community, the evolution of American institutions and values, socialization, problems of life in mass technocracy.

THIRD TERM

ANIMAL REPRODUCTION CREDIT HOURS: 3

It is the intent of this course to establish a basic knowledge of the structure and function of the typical male and female reproductory systems of domestic animals, companion (pet) animals, and selected laboratory animal species. Consideration is also given to the processes of reproduction in these various classes of animals. Background information relating to management practices and reproductive efficiency in herds or colonies of breeding animals is elaborated. Particular emphasis is placed on the recognizing of abnormal conditions relating to reproductive disorders.

CLINICAL MANAGEMENT CREDIT HOURS: 3

An introductory course designed for technicians seeking employment in a veterinary hospital. The course includes: veterinary practice ethics, client reception, office and personnel management, pharmacy operation, animal restraint, recording patient health histories, emphasis on indications of animal illness, medication and immunization techniques and orientation to veterinary practice instruments and equipment.

MAMMALIAN PHYSIOLOGY CREDIT HOURS: 3

Basic studies of the normal function of organs and organ systems as they relate to representative mammalian species. Lecture and laboratory exercises serve to demonstrate fundamental physiological processes applicable to the circulatory, respiratory, digestive, muscular, endocrine, excretory and reproductive systems.

APPLIED MICROBIOLOGY CREDIT HOURS: 4

Discussion of the characteristics of microorganisms, both pathogenic and non-pathogenic, which are of importance to animal health, dairy and food processing, as well as to public health. Emphasis is directed toward the culture and identification of selected species of these microorganisms. Standard clinical and diagnostic procedures relating to selected species of organisms important to the food and dairy field, as well as others classified as animal pathogens, are practiced in the laboratory.

INTRODUCTORY PSYCHOLOGY I CREDIT HOURS: 3

Scientific approaches to the study of the behavior of man and other organisms, including background, biological bases, development, perception, motivation, learning, emotion, personality, adjustment and social psychology.

FOURTH TERM

ANESTHETIC AND RADIOLOGIC TECHNIQUES CREDIT HOURS: 3

An introduction to anesthetic and radiological techniques as involved in veterinary hospital practice and biomedical research laboratories. The basic principles of tranquilization and anesthesia, and the role of the technician assisting with anesthesia in the operating room, are presented by lectures and video-tape presentations. Practice in anesthesia is obtained during surgical procedures with a veterinary surgeon. Fundamental radiological principles are presented by lecture; practical experience and training is obtained during scheduled laboratories and actual clinical situations. Radiologic practices include: patient positioning, X-ray equipment operation and processing of radiographic film.

ANIMAL PARASITOLOGY CREDIT HOURS: 3

A course designed to familiarize the student with life cycles, pathogenesis, identification and control of common animal parasites encountered in public health programs. Additionally, elaborated are the domestic and laboratory animal species which have implications relating to the veterinary and biomedical research fields. Special emphasis, both in lecture and laboratory exercises, is given to familiarization and identification of the more important species of parasitic protozoa, helminths and arthropods.

LABORATORY ANIMAL SCIENCE I CREDIT HOURS: 4

This course deals with basic principles relating to the breeding, maintenance and utilization of various species of laboratory animals important to current efforts in the field of biomedical research. The humane care of these animals is stressed, along with recommendations for optimal caging, nutrition and husbandry practices. Methods of tranquilization and anesthesia are also elaborated. The development of techniques relating to proper handling, restraint, rodent surgery and experimental usage of selected species is practiced in the laboratory section of this course.

ENGLISH COMPOSITION II CREDIT HOURS: 3

An intermediate course in which writing practice continues with a study of persuasion in contemporary issues in literary criticism. An introduction to the major literary types: short story and novel (fiction) drama, poetry. A study of literary structural techniques.

FIFTH TERM

ANIMAL NUTRITION CREDIT HOURS: 3

This course covers the basic principles of nutrition for all classes of animals. The nutrients are covered in detail and their synthesis and metabolism are discussed. Methods for the evaluation of foodstuffs are also discussed.

GENERAL PATHOLOGY CREDIT HOURS: 3

A course of study concerned with basic alterations in mammalian tissues as the result of the disease state. Laboratory exercises are devoted to both the gross and microscopic examination of specimens which characterize a variety of pathological changes in the organs and tissues of domestic and laboratory animals. Consideration is given to common conditions which cause and contribute to pathogenesis.

HEMATOLOGY AND URINALYSIS CREDIT HOURS: 3

A comprehensive study of vertebrate blood involving both the principles and practices necessary to promote a fundamental understanding of this subject as it relates to the training of the animal science students. Lecture periods are devoted to a consideration of the nature and functions of the circulatory system and the kidney. Laboratory periods are devoted to the actual study of blood and urine and those tests and reactions used in diagnostic evaluation.

INTRODUCTORY ECONOMICS CREDIT HOURS: 3

Study and analysis of economic principles and policies as related to the American economy, including the factors of production and their allocation, supply and demand, price and the price system, income and national income accounting, money and banking, fiscal policy and the role of government, and economic growth.

SIXTH TERM

ANIMAL SCIENCE SEMINAR CREDIT HOURS: 1-3

Selected research projects for senior students. Study program which may include both library research and laboratory investigation is under supervision of faculty, in the student's major field of interest. Presentation of a formal research paper is required. Registration by permission of faculty advisor.

GENETICS CREDIT HOURS: 3

Consideration is given to cytological and environmental factors pertaining to Mendalian inheritance, gene theory, cytoplasmic phenomena, organizers, chromosomal aberration and mutation. An effort will also be made to determine the relationships which genetics has established with cytology, evolution and morphogenesis as it relates to the welfare of man and animals.

ENGLISH COMPOSITION III CREDIT HOURS: 3

An advanced course developed to provide further insight into the qualities and varieties of expository prose, to which the student was introduced during the earlier courses in English composition. Conceptual aspects of this course are developed through extensive reading and interpretation of appropriate poetry and drama, as well as through the completion of creative writing exercises.

BRIEF DESCRIPTION OF COURSES
UNIQUE TO THE
LABORATORY ANIMAL OPTION

LABORATORY ANIMAL SCIENCE II — CREDIT HOURS: 4

An advanced course relating to specialized areas of laboratory animal technology and biomedical experimentation. Emphasis, in both lecture and laboratory sessions, is directed to the establishment and maintenance of SPF and gnotobiotic animal colonies; laboratory animal colony management; animal behavior; and advanced experimental techniques, including the completion of endocrinectomy surgery in laboratory rodents.

LABORATORY ANIMAL DISEASES — CREDIT HOURS: 3

Emphasis in this course is placed on the more important diseases encountered in laboratory animals. Primary consideration is given to parasitic, bacterial and viral caused conditions which affect the health of the more common laboratory species. Chemo-therapeutic and animal management procedures relating to control and/or elimination of diseases in laboratory animal breeding and experimental colonies are discussed. Methods involved in the clinical study and identification of representative bacterial and parasitic disease conditions of selected animal species are developed and practiced in the laboratory.

TECHNICAL REPORTING CREDIT HOURS: 1

Discussion of the methods used in retrieving technical data from library sources. The importance of scientific literature as an essential in biomedical research is emphasized through the reading of current scientific periodicals. Methods relating to preparation of technical reports are stressed. Technical report writing exercises are completed as part of the course requirement.

BRIEF DESCRIPTION OF COURSES UNIQUE TO THE VETERINARY ASSISTING OPTION

ANIMAL HEALTH CREDIT HOURS: 3

A course designed to familiarize students with the most common diseases of large animals encountered on farms in the Northeast. Particular emphasis is placed on the dairy cow, utilizing a "Herd Health Program" approach. Recognition and prevention of animal disease is stressed. Laboratory periods are devoted to demonstration and instruction in techniques useful on the farm dealing with hoof care, milk sampling, dehorning, castration and other standard techniques.

SURGICAL ASSISTING CREDIT HOURS: 2

This course is designed to supply the student with information and practical experience in assisting the veterinarian with surgical procedures and other essential supportive operating room services. Emphasis, in addition to surgery, is placed on preoperative patient preparation and post surgical care.

VETERINARY SCIENCE CREDIT HOURS: 3

Designed primarily for technical assistants working for a practicing veterinarian. This course emphasizes kennel management, breeding, obstetrics, pediatrics, geriatrics, dental hygiene, wound management, bandaging, emergency first aid. Large animal techniques covered include: hoof care, milk sampling, dehorning, blood testing and identification techniques.

BRIEF DESCRIPTION OF
UNCLASSIFIED ANIMAL SCIENCE COURSES
AVAILABLE AS ELECTIVES TO BOTH OPTIONS

FOOD SANITATION AND INSPECTION CREDIT HOURS: 4

A lecture and laboratory course designed for dairy science, animal science and food service majors who may desire training in the broad area of food sanitation and inspection and environmental health. Regulations and enforcement, emphasizing the processes of inspection and the relationship of sanitation and inspection to public health, are outlined. Epidemiology of water, milk, food and meat borne diseases are dealt with during the laboratory aspect of this course.

HISTOLOGICAL TECHNIQUES CREDIT HOURS: 2

The collection and preservation of both normal and diseased tissues suitable for histological examination. Laboratory exercises will encompass the teaching of techniques involved in the use of the modern microtome and autotechnicon.

HORSE MANAGEMENT I CREDIT HOURS: 3

Includes the selection of horses from the aspects of genetics, breeding and type. Common unsoundness, blemishes and stable vices are also covered. Current managerial practices are taught; these include: housing, pastures, worming, foot care and care of brood mare and stallion, as well as care of the pleasure horse, weanling and foal.

V. Curriculum Content and Relationships

In the construction of this curriculum (see present modification - Curricular Model IV - listed in this chapter under *Brief Course Descriptions*), the representative courses, in conjunction with the offering sequence and relationships between courses, were all considered important in achieving a model for instruction that would provide the Animal Science student with a comprehensive training program within which the development of occupational proficiencies and attitudes needed for paraprofessional employment would be assured.

A consideration of the individual courses and course relationships embodied in the Animal Science curriculum is related in the following manner:

1. Core Courses

Introductory Animal Science was inserted into the *First Term* of the curriculum to provide the beginning Animal Science student with insights and perspectives needed prior to entry into this professional field. It was intended that information gained herein would assist the individual in planning course and career objectives while completing this technical program.

For purposes of familiarizing the student with the many scientific words and terms needed in the building of a technical vocabulary concomitant with the Animal Science professional field, a course in

Medical Terminology was also provided early in the curriculum.

The establishment of a background in the basic sciences which was required prior to involvement in the applied clinical and animal oriented courses offered during the second year of training, was afforded by the Mammalian Anatomy and Histology and Mammalian Physiology sequence offered concurrently during the Second and Third Terms of the program.

A series of courses included in the core section of the curriculum for the purpose of providing both a fundamental and applied understanding of microbiology and its relationship to animal health and disease processes, was offered concurrently during the first three terms in the following order: General Microbiology (a general education course), Zoonoses and Applied Microbiology. Two additional courses, listed as electives in the second year curriculum, were available for additional training in this specialty. These will be discussed later under the heading of Elective Courses.

Clinical Management, which introduced the beginning student to fundamental administrative and procedural concepts and practices relating to veterinary hospital and other animal laboratory operations, was also included in the first in the first year curriculum. For the student seeking summer employment (on the job experience) after completion of the freshman year, this course was considered important, if not essential, in maximizing the benefits of the initial employment exercise. The course entitled Animal Reproduction which dealt with the practices and procedures related to animal breeding was also placed in the first year to provide background for possible summer employment experience in one of the many commercial laboratory animal breeding facilities located in New York State.

Freshman Mathematics and Introductory Chemistry (both general education courses), as first year offerings were intended to supply information needed by the student for an effective understanding of the basic science courses, particularly Mammalian Physiology, and also the applied clinical courses offered during the second year.

Clinically oriented courses representative of second year core requirements, included Animal Parasitology and Hematology-Urinalysis. These, along with the microbiology series offered during the first year, provided the student with a comprehensive background in the clinical laboratory sciences which were essential in the completion of diagnostic procedures required in most biomedical research laboratories and veterinary hospital operations.

Many technical procedures which apply to both the biomedical research and veterinary assisting career areas were included in Laboratory Animal Science I. Significant aspects of this course, inclusive of animal restraint, caging and maintenance requirements, breeding, sanitation and others, made it an essential inclusion in the core. In addition, this course also constituted the major prerequisite to the Laboratory Animal Option.

Anesthetic and Radiologic Techniques was a component of this curriculum which provided training in the basics of anesthesiology and also established proficiencies in the operation of X-ray equipment. It was of particular importance to the student preparing for employment as a veterinary assistant, but nonetheless had application in other proximal career areas. It was classified as an advanced course and was a prerequisite to the Veterinary Assisting Option.

To complement the clinical sequence of courses and to prepare the student for an indepth understanding of the animal disease process (both grossly and at the cellular level), the General Pathology offering was included in the second year curriculum.

To expand on the introductory information relating to the importance of genetics and nutrition presented as part of Laboratory Animal Science I, full length courses in these two subject areas, namely Animal Nutrition and Genetics were required for second year students during the concluding two terms of the program. These courses, both lecture oriented, were ancillary to the laboratory skills courses, but nonetheless essential in providing an understanding of effective methods of selective breeding and nutritional maintenance of laboratory, companion and domestic animals.

As a culminating feature of this technical program, a course was included in the final term of the curriculum which enabled the student, on an individual basis, to apply the training received, toward the solution of a research problem of his choice. This exercise incorporated the combined resources of the library and laboratory in its completion. The course entitled Animal Science Seminar, a divisional graduation requirement, was organized to include interim advisement and final evaluation of each project by members of the Animal Science faculty. The submission of a written technical report, as well as an oral presentation at the conclusion of each project, was required.

In concluding the core section of this curriculum a three course sequence in English and a similar obligation in the social sciences area were included. Both of these were classified as general education requirements.

English Composition I, II and III, interspersed throughout both years of the program, were intended to furnish the student with written and verbal comprehension and facility. Unfortunately, due to the general structure of this sequence, a technically oriented introduction to basic communication skills, which would have been particularly beneficial to the student, was not included in the format of this series.

The social science courses, also diffusely scheduled in the curriculum, included: Introductory Sociology, Introductory Psychology and Introductory Economics. Although these selections were recommended, the student was allowed, on a limited basis, to elect other social science offerings, if desired, in fulfilling this requirement. The Introductory Sociology and Introductory Psychology courses were included in the curricular design to assist the student in understanding himself as an individual and as a contributing member of society. Relationships between the student and other individuals, including those between employee-employer, were also stressed. The Introductory Economics offering was selected to establish a fundamental knowledge relating to the systems, policies and philosophies on which the American economy is based.

2. Elective Courses

In addition to the core requirements and relationships just discussed, a series of elective courses constituting a specialization in Laboratory Animal Technology and another in Veterinary Assisting Technology were also available within the structure of this curriculum. A final sequence identified as Unclassified Electives was also available for selection by students in both option areas.

Elective courses were considered according to respective options, as follows:

A. Laboratory Animal Option

The specialty sequence representative of this option was included to introduce and develop competence in selected techniques and procedures required in biomedical research laboratories, commercial laboratory animal breeding facilities and other career areas proximal to the research field. In this regard, Laboratory Animal Science II provided training in germfree animal techniques, specialized rodent surgery (primarily endocrinectomy procedures) and animal behavior. Laboratory Animal Diseases was involved with an indepth consideration of the common diseases of laboratory animals which were important to the research investigator and commercial breeder. In this course, management practices, diagnostic procedures and quality control were introduced and elaborated.

A knowledge of technical writing and literature surveying, as an integral part of most research efforts, is well recognized. To prepare the student (even at the two-year level) for this eventuality, Technical Reporting was included in this option series.

B. Veterinary Assisting Option

The student selecting this option was additionally prepared through participation in a series of three additional specialized courses (offered in the second year curriculum) for employment as a paraprofessional assistant to a veterinary practitioner involved in either small or large animal practice. Designed into this sequence was a course in Animal Health, which furnished information relating to husbandry and management practices needed to eliminate disease and establish and maintain health, particularly in large domestic animal herds. Surgical Assisting, an adjunct to the core course in Anesthetic and Radiologic Techniques, was considered a key offering to those selecting this option. Many techniques of importance, but classified as ancillary to the completion of surgery by the veterinarian, were introduced. In part, these included processing and sterilization of surgical packs, preparation of the surgical patient, assisting with anesthesia, participation as a nurse assistant during surgery and post surgical care of the patient.

To provide a final indoctrination for the veterinary assisting student in the sixth term of the program (immediately prior to initiating employment) a course in Veterinary Science was scheduled. This offering consisted of a broad topical approach and included information relating to kennel management, breeding, emergency first aid, wound management, dental hygiene and many other performance areas for which the veterinary assistant was trained.

C. Unclassified Option

A series of elective courses available to participants of both options was represented in this category. Food Sanitation and Inspection, taken in conjunction with various other core and elective courses, provided qualifications for employment in meat inspection and sanitarian positions.

Histological Techniques was identified as a course which could furnish the student with additional diversified skills, sufficient to enable qualification for employment as a histological technician in research or in a human hospital laboratory.

Horse Management was inserted into the curriculum to assist the student that desired employment as a veterinary assistant to a large animal practitioner or to the individual who displayed an avocational interest in this subject area.

In addition to the learning experience and proficiency development provided by the Animal Science curriculum, it was also recommended, but not required, that the student attempt to locate employment during the summer, after completion of the freshman year, which related directly or proximally to the Animal Science professional field.

Supplemental information relating to courses and course content can be obtained by consulting the Condensed Course Outline section at the end of this chapter. Detailed course information is available in Volume II of this document.

VI. Continuing Education

Although it was the primary objective of this curriculum to train and prepare the student for paraprofessional entry level positions in the animal sciences occupational area, many graduates of the program decided to delay employment in favor of obtaining additional education. In evidence of this trend, Table III, page 74, indicated that of 247 graduates representing the classes of 1963-1969, a total of 90 or 36% chose to continue academic pursuits on a full-time basis.

In addition, an undetermined percentage of graduates classified in an employed status were enrolled in Evening Studies Programs at colleges within commuting distance of their homes or places of employment. Most of these individuals were employed by pharmaceutical laboratories or other bio-industrial facilities that provided liberal stipends for employees sufficiently motivated to seek additional part-time education.

Most of the graduates (both male and female) continuing their education on a full-time basis were enrolled in baccalaureate degree programs.

Pursuit of the upper level degree was most frequently directed toward one of the following academic areas:

1. Large Animal Science
2. Liberal Arts - Biology or Zoology
3. Medical Technology
4. Laboratory Animal Science (limited programs)
5. Wildlife Conservation

Part-time students were usually involved in liberal arts biology-zoology programs, either on a special student basis or as a degree candidate.

Animal Science graduates have had little difficulty in transferring to other educational institutions, both within and outside of New York State. Cornell University, Ohio State, Kansas State, University of Georgia, University of Washington, University of New Hampshire, and many of the units of the State University of New York, constitute a partial listing of universities and colleges that have readily accepted graduates of the Animal Science program.

Presently, several graduates who transferred to Cornell University have completed pre-veterinary requirements and are now attending the New York State Veterinary College located at Cornell.

Small numbers of graduates of the Animal Science program who are not pursuing additional education on a formal basis have participated in short one-week summer courses offered by this department. These are classified as skills courses and pertain to the clinical and laboratory animal sciences.

VII. Course Outlines (Condensed Version)

To enable a further understanding of the curriculum presently in use in the Animal Science program (enumerated in Curriculum Model IV, page 128) a condensed version of each course offering (inclusive of general profile data, course objectives and approach, instructional methods, textbook information and a brief topical course outline) is presented on the following pages.

COURSE OUTLINE (Condensed Version)

COURSE TITLE INTRODUCTORY ANIMAL SCIENCE

CREDIT HOURS 3 TERM OFFERED First

2 LECTURES 1 Hour PER WEEK 1 LABORATORY 2 Hours PER WEEK

PREREQUISITES None

COURSE OBJECTIVE AND APPROACH

To establish a general background for the beginning student in the areas of agricultural, veterinary and laboratory animal science. In effectively accomplishing this objective the course is designed to include both lectures and laboratory exercises which will introduce simultaneously, the technological and functional aspects of the animal science field.

INSTRUCTIONAL METHODS

Lecture series, laboratory exercises, field trips to the College Farm facility, demonstrations, films and other audio-visual supplements were used as methods of instruction in the presentation of this course.

TEXT

Campbell, J. R. and J. F. Lasley. The Science of Animals That Serve Mankind.

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

		Class Hours	Laboratory Periods
I.	Introduction to Animal Science	2	1
II.	Introduction to Animal Breeds	3	1
III.	Animal Restraint	2	1
IV.	Animal Care	2	1
V.	Animal Behavior	3	1
VI.	Animal Selection	3	3
VII.	Principles of Selection and Mating of Animals	1	1
VIII.	Physiology of Growth and Senescence	3	1
IX.	Ecology and Environmental Physiology	2	0
X.	Orientation Relating to Animal Science Technology and other Curricular Areas Within the Agricultural Division . . .	1	1
	Totals . . .	22	11

NOTE: Laboratory exercises designed for this course are enumerated in Volume II (Detailed Course Outlines).

COURSE OUTLINE (Condensed Version)

COURSE TITLE MEDICAL TERMINOLOGY

CREDIT HOURS 1 TERM OFFERED First

1 LECTURE 1 Hour PER WEEK

PREREQUISITES None

COURSE OBJECTIVE AND APPROACH

To introduce Animal Science Technology students to the professional language of the Veterinary and Biomedical Field. Since the understanding and carrying out of instructions given in a hospital or medical laboratory requires exact communication, the mastery of medical terminology is essential. Completion of this course provides the student a base upon which to build a professional vocabulary in advanced technical courses.

The primary objective of this course, therefore, is to assist the student in developing the ability to read and understand the language of medicine.

INSTRUCTIONAL METHODS

Technical paradigms, diagrams, 35 mm slides and other visual supplements are used to illustrate and make *words* and *terms* more understandable. To further promote instruction the student is encouraged to use a medical dictionary. Outside reading and writing assignments are given as practice exercises.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

		Class Hours
I.	Introduction to Medical Terminology	1/2
II.	Study of Word Elements	1-1/2
III.	Examples of Word Analysis and Definition	2
IV.	Study of Selected Medical Terms from the Animal Science Field	6
V.	Class Term Papers Incorporating the Use of a Maximum Number of Medical Terms	1
	Total	11

COURSE OUTLINE (Condensed Version)

COURSE TITLE FRESHMAN MATHEMATICS (General Education Course)

CREDIT HOURS 3 TERM OFFERED First

3 LECTURES 1 Hour PER WEEK

PREREQUISITES None

COURSE OBJECTIVES AND APPROACH

To provide the student with a background in mathematics sufficient to comprehend the basic concepts and principles which relate to the technical courses in the Animal Science curriculum.

In establishing a functional understanding of this subject the student is expected to complete practical problems and exercises relating to basic mathematics and the operational aspects of basic algebra.

Fundamental concepts relating to real number systems, properties of numbers, laws of exponents, linear equations, application of algebraic techniques to solution of word problems, will be established.

INSTRUCTIONAL METHODS

A lecture-recitation series approach, along with the completion of outside assignments, is used as the primary method of instruction for this course.

TEXT

Roberts, H. M. and D. S. Richardson. Elements of Mathematics.

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours
I. Algebraic Concepts and Operations Involving Sets of Integers	6
II. Algebraic Concepts and Operations Involving the Set of Rational Numbers	8
III. Linear Equations	8
IV. Special Products and Factoring	6
V. Irrational Numbers, Fractional Exponents and Radicals	5
Total	33

COURSE OUTLINE (Condensed Version)

COURSE TITLE GENERAL MICROBIOLOGY (General Education Course)

CREDIT HOURS 3 TERM OFFERED First

3 LECTURES 1 Hour PER WEEK 1 LABORATORY 3 Hours PER WEEK

PREREQUISITES None

COURSE OBJECTIVE AND APPROACH

To familiarize the student with the characteristics of bacteria, viruses, fungi and protozoa, particularly as they relate to man's environment. In achieving the objectives of this course the student will become familiar with the classification, identification, culture and control of the most common microbial species of concern in public health and industry. Techniques essential to the accomplishment of course objectives are developed by the individual student in the scheduled laboratory sessions.

INSTRUCTIONAL METHODS

Lecture and laboratory sequences, reading assignments, classroom discussion, demonstrations, films and other audio-visuals are utilized to provide effective instruction in this course.

TEXT

Pelczar, R. and W. Reid. Microbiology.

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

		Class Hours	Laboratory Periods
I.	Scope of Microbiology	2	*
II.	History and Development of Microbiology	2	See Page
III.	Microbial Taxonomy	1	162
IV.	Microscopy and Staining . . .	2	
V.	Anatomy and Cultivation of Bacteria	2	
VI.	Reproduction and Growth . . .	2	
VII.	Enzymes	2	
VIII.	Bacterial Metabolism	1-1/2	
IX.	Bacterial Genetics	2	
X.	Orders of Bacteria	2	
XI.	The Fungi-Molds	1	
XII.	Yeasts	2	
XIII.	Rickettsiae and Algae	1	
XIV.	Protozoa	1	
XV.	Viruses	2	
XVI.	Control of Microorganisms . .	1	
XVII.	Antibiotics and Chemotherapeutic Agents	1-1/2	
XVIII.	Pathogens Virulence and Infection	1	
XIX.	Resistance and Immunity . . .	1	
XX.	Selected Areas of Application of Microbiology	3	
	Totals . .	33	11

* Due to the schedule of presentation, lecture content and laboratory exercises could not always be coordinated. Complete information relating to laboratory content can be found in Volume II (Detailed Course Outlines).

COURSE OUTLINE (Condensed Version)

COURSE TITLE INTRODUCTORY CHEMISTRY (General Education Course)

CREDIT HOURS 3 TERM OFFERED First

2 LECTURES 1 Hour PER WEEK 1 LABORATORY 3 Hours PER WEEK

PREREQUISITE None

COURSE OBJECTIVE AND APPROACH

To provide the student with a basic knowledge of the language of chemistry, its symbols and fundamental mathematical relationships. It is also intended to develop ability and skills which are needed to probe the various fundamental phases of chemistry thereby establishing the correlation of this discipline to various areas of biological and agriculturally oriented technology. An introduction to the empirical basis of chemistry is gained through the completion of a series of laboratory exercises that emphasizes familiarization and usage of equipment and instrumentation which is important to the animal science oriented student.

INSTRUCTIONAL METHODS

The approach to instruction in this course includes scheduled lectures, laboratory exercises, discussion sessions, audio-visual supplements and homework assignments.

TEXT

Wood, J., et al. *Fundamentals of College Chemistry.*

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours	Laboratory Periods
I. Units of Measure, Characteristic Properties of Matter and Energy	2	* See Below
II. Atomic and Molecular Structure Periodicity of the Elements	3	
III. States of Matter	3	
IV. Stoichiometry	4	
V. Solutions	3	
VI. Colloidal System	1	
VII. Metallic Elements	2	
VIII. Non Metallic Elements	1	
IX. Carbon Compounds	3	
Totals	22	11

* Due to the schedule of presentation, lecture content and laboratory exercises could not always be coordinated. Complete information regarding laboratory content can be found in Volume II (Detailed Course Outlines).

COURSE OUTLINE (Condensed Version)

COURSE TITLE MAMMALIAN ANATOMY AND HISTOLOGY

CREDIT HOURS 5 TERM OFFERED Second

3 LECTURES 1 Hour PER WEEK 1 LABORATORY 2 Hours PER WEEK

1 RECITATION 1 Hour PER WEEK

PREREQUISITES None

COURSE OBJECTIVE AND APPROACH

To establish a basic science background in comparative, gross and microscopic anatomy of the various domestic animals and laboratory animals involved in biomedical research and veterinary practice. In accomplishing the stated objectives, gross anatomy is taught primarily through dissection of preserved canine specimens with correlation of structures observed on the preserved specimen and live animal palpation and observation. The microscopic anatomy of the tissues of the body are studied concurrently with the gross anatomy by the use of histological sections on microscopic slides, as well as 35 mm color slides of histologically prepared tissue.

INSTRUCTIONAL METHODS

A conceptual understanding of anatomy is attained through the use of anatomical paradigms, prepared skeletons, preserved canine cadavers used as dissection models, histological microslides and 35 mm projectables, films and other audio-visual supplements. These teaching resource materials are employed in lecture, laboratory and recitation sessions.

TEXTS

Frandson, R. D.	Anatomy and Physiology of Farm Animals.
Miller, M. E.	Guide to the Dissection of the Dog.

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours	Laboratory Periods
I. Gross Anatomy		
A. Introduction	3	1
B. Skeletal System	2	1
C. Muscular System	2	3
D. Nervous System	2	1
E. Cardio-Vascular System	2	2
F. Respiratory System	1	1/2
G. Uro-Genital System	3	1/2
H. Endocrine System	2	1/2
I. Digestive System	2	1/2
J. Special Senses (Eye and Ear)	2	1
Totals	21	11

		Recitation Periods
II. Microscopic Anatomy		
A. Epithelial Tissue	3	2
B. Muscle Tissue	1	1
C. Connective Tissue	3	2
D. Blood and Lymph	1	2
E. Endocrine Glands	2	1
F. Nervous Tissue	1	1
G. Digestive Tissue	1	2
Totals	33	11

COURSE OUTLINE (Condensed Version)

COURSE TITLE ZOONOSES

CREDIT HOURS 3 TERM OFFERED Second

3 LECTURES 1 Hour PER WEEK

PREREQUISITES General Microbiology

COURSE OBJECTIVE AND APPROACH

To familiarize the student with the important infectious diseases of animals which may be transmitted to man or vice versa. In the realization of this objective, the epidemiological characteristics, causative agent, symptoms, pathogenicity and recommended control for each disease is covered. Public health significance of zoonotic diseases affecting laboratory animals as well as domestic large and small animals are emphasized.

In addition to acquiring knowledge for self-protection, it is intended that the beginning student become better acquainted with some of the many pathogens which plague man and animals. Likewise, during the course, the student should begin to acquire an appreciation for the importance of good colony and herd management, proper sanitation practices and the latest methods of disease control and prevention.

INSTRUCTIONAL METHODS

Extensive use of films, most of which are obtained from the Communicable Disease Center, Atlanta, Georgia, enables the student to observe the pathological manifestations in animals of many of the diseases discussed in this course. Current information regarding diagnostic techniques, immunization programs, treatment and management of many of the zoonotic diseases are discussed in the lecture sessions.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours
I. Infectious and Communicable Disease Terminology	5
II. Infectious Agents and Their Relation to Establishment of Disease	2
III. Study of Individual Zoonotic Diseases	
A. Virus Diseases	10
B. Rickettsial Diseases	3
C. Fungus Diseases	3
D. Bacterial Diseases	10
Total	33

COURSE OUTLINE (Condensed Version)

COURSE TITLE ENGLISH COMPOSITION I (General Education Course)

CREDIT HOURS 3 TERM OFFERED Second

3 LECTURES 1 Hour PER WEEK

PREREQUISITES None

COURSE OBJECTIVE AND APPROACH

To introduce and familiarize the student with recommended methods of expression and interpretation. A study of the characteristics and uses of description, narration and definition are introduced and elaborated through frequent writing exercises aimed at the control of structure and meaning. Emphasis in the instruction of the course is also placed on problems of reasoning; for example, logical fallacies, fact/opinion distinctions, modes of interference and kinds and methods of argument.

INSTRUCTIONAL METHODS

Lecture, recitation sessions, workshops and practice writing exercises are included in the presentation of material and development of skills relating to this course.

TEXT

Buckler, W. and A. Sklare. *Essentials of Rhetoric.*

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

		Class Hours
I.	Description	6
II.	Content	6
III.	Definition	8
IV.	Progress	6
V.	Reasoning	7
	Total	33

COURSE OUTLINE (Condensed Version)

COURSE TITLE INTRODUCTORY SOCIOLOGY (General Education Course)

CREDIT HOURS 3

2 LECTURES 1 Hour PER WEEK

PREREQUISITES None

COURSE OBJECTIVE AND APPROACH

To introduce the student to the social forces which influence and shape the society in which he lives. In accomplishing this objective, a background in sociology is established by examining some of the more important social problems of contemporary man in Western society. Areas of social impact which will be probed indepth include race relations, the urban community, the evolution of American institutions and values, socialization and problems of life in mass technocracy.

INSTRUCTIONAL METHODS

Lectures, films and class problem-oriented debates are utilized for basic presentation of course material and class response. In addition, to provide the student with a more extensive appreciation of social influences relating to his own life; seminars on current social issues, selected readings and class discussions are integrated into the content of this course.

TEXT

Broom, W. and E. Selznick. Sociology: Text With Adapted Readings.

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

		Class Hours
I.	Introduction to Sociology	2
II.	Social Organizations	2
III.	Culture	2
IV.	Socialization	2
V.	Social Stratification	2
VI.	Associations	2
VII.	Collective Behavior	2
VIII.	Demography	2
IX.	Religion in Comtemporary America	2
X.	Urban Man	5
XI.	Contemporary Race Relations: The Negro in America	5
XII.	Social Change in Contemporary America	5
	Total	33

COURSE OUTLINE (Condensed Version)

COURSE TITLE ANIMAL REPRODUCTION

CREDIT HOURS 3 TERM OFFERED Third

3 LECTURES 1 Hour PER WEEK

PREREQUISITES Mammalian Anatomy and Histology recommended

COURSE OBJECTIVE AND APPROACH

To provide a basic knowledge of reproductive processes in domestic animals. To give the student the necessary background to enable him to manage reproductive efficiency in domestic animals and to be able to recognize the presence of abnormal conditions and when to seek veterinary assistance with reproductive disorders.

INSTRUCTIONAL METHODS

A lecture series supplemented with selected films, is the fundamental approach used for the presentation of this course.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours
I. Anatomy of the Reproductive System	3
II. Hormonal Physiology	3
III. Estrus Cycles	2
IV. Sperm and Ova	1
V. Artificial Insemination	2
VI. Pregnancy	3
VII. Behavior	4
VIII. Species Reproduction	6
IX. Reproductive Failure	4
X. Reproductive Diseases	5
Total	33

COURSE OUTLINE (Condensed Version)

COURSE TITLE CLINICAL MANAGEMENT

CREDIT HOURS 3 TERM OFFERED Third

3 LECTURES 1 Hour PER WEEK

PREREQUISITES None

COURSE OBJECTIVE AND APPROACH

To familiarize the student with veterinary hospital techniques and procedures which are largely paraprofessional in nature. Emphasis and instruction during the course will relate to the following: veterinary practice ethics, hospital-client relations, records kept in veterinary medical practice, pharmacy operation, surgical and medical assisting techniques, principles of human relations, animal restraint methods and other related practice techniques.

While becoming oriented to the many phases of veterinary hospital operation and management, the student should also gain an appreciation for professional veterinary practice ethics.

INSTRUCTIONAL METHODS

The lecture series serves to outline the course material. Exams and quizzes will also be given during this time. To give instructional variety to the course, motion picture films, filmstrips, 2 x 2 slides and video tapes supplement lecture material when these are available. To provide relevance, guest speakers from the veterinary profession will present a selected number of lectures.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISION	Class Hours
I. Course Introduction	1-1/2
II. Principles of Veterinary Medical Ethics and Jurisprudence	4
III. Definition and Legal Status of the "Veterinary Technician" in Veterinary Medical Practice	2
IV. Areas of Ancillary Service Performed by or Under the Supervisory Responsibility of the Veterinary Technician	
A. Client Reception	3
B. Role of Office Secretary	2-1/2
C. Bookeeping Responsibilities	4
D. Drug Handling, Dispensing and Related Pharmaceutical Activities	4
E. Examination and Treatment Room Assistant	1/2
F. The Surgical Technician's Role	3
G. Duties and Responsibilities of the Surgical-Medical Nurse	3
H. Clinical Laboratory Techniques	1/2
I. Discharging Hospital Patients	1/2
V. Human Relations (and the Supervisor)	3
VI. Principles of Small Animal Restraint and Related Techniques	1-1/2
Total	33

COURSE OUTLINE (Condensed Version)

COURSE TITLE MAMMALIAN PHYSIOLOGY

CREDIT HOURS 4 TERM OFFERED Third

3 LECTURES 1 Hour PER WEEK 1 LABORATORY 2 Hours PER WEEK

PREREQUISITE Mammalian Anatomy and Histology

COURSE OBJECTIVE AND APPROACH

To study the function of cells, tissues, organs and systems involved in mammalian organisms primarily utilized in laboratory animal situations and those animals most commonly involved in a veterinary practice. Lecture periods follow a pattern which elaborates each anatomical system with regard to its function and behavior. Emphasis is on applied physiology that will enable the technician to be able to complement a veterinarian in practice or a research professional in a biomedical institution.

INSTRUCTIONAL METHODS

Methods of instruction include demonstrations, student projects with animals, films and video tapes, in addition to the regularly scheduled lectures and laboratory exercises.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours	Laboratory Periods
I. Introduction	2	0
II. Cellular Physiology	5	1
III. Nervous System	4	1
IV. Muscular System	3	1
V. Circulatory System	3	2
VI. Respiratory System	3	1
VII. Digestive System	4	1
VIII. Urinary System	4	2
IX. Reproductive and Endocrine Systems	5	0
X. Special Senses (Eye and Ear)	0	1
XI. Large Animal Physiology	0	1
Totals	33	11

COURSE OUTLINE (Condensed Version)

COURSE TITLE APPLIED MICROBIOLOGY

CREDIT HOURS 4 TERM OFFERED Third

3 LECTURES 1 Hour PER WEEK 1 LABORATORY 2 Hours PER WEEK

PREREQUISITES General Microbiology

COURSE OBJECTIVE AND APPROACH

A course designed on a multiple application basis and intended to familiarize the student with the fields of dairy, food and pathogenic microbiology.

The dairy, food aspect, which represents the minor emphasis area of this course, is organized to acquaint the student with the classes of bacteria which are most commonly involved and of importance, both beneficially and adversely, in the processing and manufacture of foodstuffs and milk products.

The pathogenic microbiology section of this course represents the major emphasis area and is devoted to a comprehensive presentation of the identifying characteristics and pathological manifestations of organisms which show disease causing potential in man and animals.

INSTRUCTIONAL METHODS

A maximum learning experience is achieved through the use of instructional supplements such as films, demonstrations and guest lecturers in addition to regular lecture and laboratory sessions.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours	Laboratory Periods
I. Introduction to Dairy and Food Microbiology	2	* See Page 184
II. Beneficial and Contaminating Microorganisms	2	
III. Factors Influencing Dairy and Food Processing	1	
IV. Factors that Effect the Growth and Metabolism of Dairy and Food Microorganisms	1	
V. Quality Control Determination . . .	2	
VI. Common Dairy and Food Pathogenic Microorganisms	2	
VII. Sanitation Practices	1	
VIII. Introduction to Pathogenic Microbiology	2	
IX. The Causes of Disease	2	
X. The Protective Mechanisms of the Body	1	
XI. Toxins and Antitoxins	1	
XII. The Lytic Antibodies	1	
XIII. Agglutinins, Precipitins, Phagocytosis	1	
XIV. Hypersensitization	1	
XV. The Pathogenic Microorganisms . . .	12	
XVI. Sterilization & Sanitization Techniques	1	
Totals . . .	33	11

* Due to the schedule of presentation, lecture content and laboratory exercises could not always be coordinated. Complete information regarding laboratory content can be found in Volume II (Detailed Course Outlines).

COURSE OUTLINE (Condensed Version)

COURSE TITLE INTRODUCTORY PSYCHOLOGY (General Education Course)

CREDIT HOURS 3 TERM OFFERED Third

3 LECTURES 1 Hour PER WEEK

PREREQUISITES None

COURSE OBJECTIVE AND APPROACH

To provide the student with a knowledge and appreciation of the basic principles of psychology as it relates to man in present day society.

Functional approaches pertaining to the study of behavior of man and other organisms will include considerations of background, biological bases of behavior, development, perception, motivation, learning, emotion, personality and adjustment.

It is also the intent of this course to involve the student in thought and discussion of theoretical issues, as well as the practical applications of psychology as it involves individuals and groups.

An understanding of the principles and concepts discussed could assist the student functionally through improved interaction with our complex society.

INSTRUCTIONAL METHODS

Demonstrations, discussions, supplemental reading assignments and also papers on selected relevant topics are included to enhance instruction and provide a conceptual approach to this course.

TEXT

Hilgard, E. R. and R. C. Atkinson. Introduction to Psychology.

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISION	Class Hours
I. Course Introduction	5
II. Biological Bases of Behavior	2
III. Development	2
IV. Personality	3
V. Psychometrics	2
VI. Perception	2
VII. Motivation	2
VIII. Learning	3
IX. Emotion	2
X. Adjustment	4
XI. Mental Health	3
XII. Social Psychology	3
Total	33

COURSE OUTLINE (Condensed Version)

COURSE TITLE ANESTHETIC AND RADIOLOGIC TECHNIQUES

CREDIT HOURS 3 TERM OFFERED Fourth

2 LECTURES 1 Hour PER WEEK 1 LABORATORY 2 Hours PER WEEK

PREREQUISITES Mammalian Anatomy and Histology
Mammalian Physiology

COURSE OBJECTIVE AND APPROACH

To provide an introduction to radiological techniques and anesthesia of animals involved in the practice of veterinary medicine and in biomedical institutions. Each student will learn to position a patient, calculate exposure values, expose radiograph films and process radiographs of diagnostic value. Various anesthetic agents are demonstrated and the student learns to administer the most common barbiturate and inhalant anesthetics.

INSTRUCTIONAL METHODS

Demonstrations, laboratory practice in methods of animal anesthesia and operation of the X-ray laboratory, along with basic information lectures, are utilized in this course.

TEXT

Lumb, W. V. Small Animal Anesthesia.

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours	Laboratory Periods
I. Introduction to Anesthesia	1	1
II. General Considerations	2	
III. Preanesthetic Drugs	2	1/2
IV. General Anesthesia	4	5
V. Anesthesia Monitoring	2	
VI. Anesthetic Emergencies	2	1
VII. Introduction to Radiology	1	
VIII. X-ray Production	2	1
IX. Image Recording	1	
X. Exposure Factors	1	1
XI. Film Storage and Handling	1	1/2
XII. Film Processing	1	1
XIII. Safety Procedures	1	
XIV. Radiographic Technical Failure	1	0
Totals	22	11

COURSE OUTLINE (Condensed Version)

COURSE TITLE ANIMAL PARASITOLOGY

CREDIT HOURS 3 TERM OFFERED Fourth

2 LECTURES 1 Hour PER WEEK 1 LABORATORY 2 Hours PER WEEK

PREREQUISITES Mammalian Anatomy and Histology
Applied Microbiology

COURSE OBJECTIVE AND APPROACH

To provide a basic but comprehensive understanding of the more important parasites of domestic, zoo and laboratory animals. Classes of parasites to be studied will include the protozoans, helminths and insects.

The student will be required, as the result of this course, to know phylogenetic classification, life cycles (when of practical importance), pathogenicity, parasite transmission and control. Emphasis will be placed on those parasites of significance to public health or meat and food inspection.

The student will also be expected to understand how parasitism affects growth, production, and reproduction and how the chain of transmission can be broken. Latest methods of prevention and control will be presented.

INSTRUCTIONAL METHODS

Films, film strips, 35 mm slides, microscopic slides, and plastic mounts are used to supplement live specimens taken from local animals for purposes of study and review in the laboratory. Laboratory periods will be utilized in isolation and identification of the more common parasites of importance in veterinary and laboratory animal medicine.

TEXT

Benbrook, E. A. and M. W. Sloss. Veterinary Clinical Parasitology.

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours	Laboratory Periods
I. General Introductory Considerations of Parasites	3	* See Below
II. Protozoa	3	
III. Helminth Parasites	8	
IV. Arthropod Parasites	7	
V. Summary and Conclusions	1	
Totals	22	11

* Due to the schedule of presentation, lecture content and laboratory exercises could not always be coordinated. Complete information regarding laboratory content can be found in Volume II (Detailed Course Outlines).

COURSE OUTLINE (Condensed Version)

COURSE TITLE LABORATORY ANIMAL SCIENCE I

CREDIT HOURS 4 TERM OFFERED Fourth

3 LECTURES 1 Hour PER WEEK 1 LABORATORY 3 Hours PER WEEK

PREREQUISITES Comparative Anatomy and Histology

COURSE OBJECTIVE AND APPROACH

To provide the student with a basic knowledge of laboratory animal technology and small animal anesthesiology, and to assist him in developing a conceptual understanding of fundamental methods and procedures relating to animal research and breeding techniques.

To have the individual understand the design of vivarial facilities, along with equipment recommended to provide an optimal environment for animals being utilized for breeding or experimentation.

To provide the student with an explanation of Federal laws and regulatory requirements governing the maintenance and use of laboratory animals.

INSTRUCTIONAL METHODS

In addition to the regularly scheduled lecture series, which is supplemented by the use of guest speakers, films and demonstrations, and weekly laboratory exercises, students also participate throughout the entire term in laboratory animal practice. In the completion of this exercise, each student is assigned in both animal technician employee and supervisory capacities to maintain the animal vivarial facility on a continuing operational basis, thus duplicating a work experience situation.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS	Class Hours	Laboratory Periods
I. Introduction to Laboratory Animal Technology	2	* See Page 196
II. Laboratory Animal Facilities and Equipment for Conventional Breeding and Research Facilities	3	
III. Barrier Systems Design and Specifications for Breeding and Research Facilities . . .	3	
IV. Classification and Discussion of Laboratory Animals According to Microbiological Profile (Qualities)	2	
V. General Requirements Relating to Laboratory Animal Food (non-nutritional) and Cage Bedding Material	1	
VI. Basic Nutrition and Essential Components of Laboratory Animal Feed	2	
VII. General Information Relating to Disease and Parasite Control in Laboratory Animal Facilities	3	
VIII. Chemical Disinfectants	2	
IX. Breeding and Mating Systems . .	2	

	Class Hours	Laboratory Periods
X. Record Keeping in Breeding and Research Colonies . . .	1	
XI. General Uses of Laboratory Animals for Biological and Biomedical Research . . .	2	
XII. Tranquilization and Anesthesia	4	
XIII. Euthanasia	1	
XIV. Fundamental Physiological and Breeding Information Relating Individually to Common Laboratory Species .	5	
Totals	33	11

* Due to the schedule of presentation, lecture content and laboratory exercises could not always be coordinated. Complete information regarding laboratory content can be found in Volume II (Detailed Course Outlines).

COURSE OUTLINE (Condensed Version)

COURSE TITLE ENGLISH COMPOSITION II (General Education Course)

CREDIT HOURS 3 TERM OFFERED Fourth

3 LECTURES 1 Hour PER WEEK

PREREQUISITE English Composition I

COURSE OBJECTIVE AND APPROACH

To extend and elaborate the study and practice of expression and narration established in English Composition I. To accomplish the objectives of this course, writing practice continues with a comprehensive study of persuasion as it relates to contemporary issues in literary criticism. The student also receives an introduction to some of the major classifications of literature; namely, the short story and novel (fiction), drama and poetry. A study of literary structural techniques is also included.

INSTRUCTIONAL METHODS

Class discussions, reading assignments and writing of essays constitute the primary instructional approach used in this course.

TEXT

Guth, H. Literature.

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

		Class Hours
I.	Persuasion	10
II.	Literature	23
	Total	33

COURSE OUTLINE (Condensed Version)

COURSE TITLE ANIMAL NUTRITION

CREDIT HOURS 3 TERM OFFERED Fifth

3 LECTURES 1 Hour PER WEEK

PREREQUISITES None

COURSE OBJECTIVE AND APPROACH

To impart the fundamental principles of animal nutrition through a study of the essential components of feed, as well as its digestion and utilization by the animal body.

The student should become aware of the importance of vitamins, mineral salts, and trace elements to normal physiological function in animals, as well as the effects of antibiotics, hormones and other growth stimulating substances.

The student should be able to relate the applied information from this course to domestic animals, companion (pet) animals and laboratory animals.

INSTRUCTIONAL METHODS

In addition to the lecture series, instructional techniques intended to enhance the study of nutrition, also includes field trips, audio-visual supplements and the completion of feed formulation problems relating to the nutritional requirements of various classes of animals.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

		Class Hours
I.	Introduction to Nutrition	1
II.	Digestion and Absorption of Food	2
III.	Determining the Analysis and Usefulness of Animal Feeds	3
IV.	Values of Feed Concentrates	2
V.	Factors Affecting Feed Values	2
VI.	Nutritional Maintenance of Animals	3
VII.	The Carbohydrate Needs of Animals	2
VIII.	The Lipid Needs of Animals	2
IX.	The Protein Needs of Animals	2
X.	Mineral Needs of Animals	2
XI.	Vitamins: Importance and Function	2
XII.	Antibiotics, Hormones and Other Growth Stimulating Substances	3
XIII.	Present Methods Utilized in the Manufacture of Feeds	2
XIV.	Quality Control Methods Relating to Feeds	3
XV.	Future Development in the Field of Animal Nutrition	2
	Total	33

COURSE OUTLINE (Condensed Version)

COURSE TITLE GENERAL PATHOLOGY

CREDIT HOURS 3 TERM OFFERED Fifth

2 LECTURES 1 Hour PER WEEK 1 LABORATORY 2 Hours PER WEEK

PREREQUISITES Mammalian Anatomy and Histology
Mammalian Physiology

COURSE OBJECTIVE AND APPROACH

To acquaint the student with changes occurring in animal tissues as the result of disease. In completion of this course the student should acquire an understanding of how and why abnormalities or lesions develop in the body, and therefore be better equipped to observe clinically the first signs of sickness or disease in domestic, companion and laboratory animals.

The student should gain experience in detecting disease conditions by performing necropsies as often as opportunities to do so are presented.

INSTRUCTIONAL METHODS

The lecture periods will be used to outline the basic principles of veterinary pathology. Instructional films will be used where applicable and available. Laboratory sessions will be structured so as to illustrate and demonstrate those concepts and principles discussed in lecture. Laboratory study will be implemented through the use of both macro- and microscopic tissue specimens.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS	Class Hours	Laboratory Periods
I. Introduction and Historical Development of Pathology	3	* See Below
II. Etiology		
1. Intrinsic Causes of Disease . .	1	
2. Extrinsic Causes of Disease of a Nutritional Nature		
a. General Nutrients	2	
b. Minerals	5	
c. Vitamins	3-1/2	
3. Extrinsic Causes of Disease of Physical, Chemical and Viable Natures		
a. Types of Physical Influences	3-1/2	
b. Chemical Influences . . .	2	
c. Viable Influences	2	
Totals . . .	22	11

* Due to the schedule of presentation, lecture content and laboratory exercises could not always be coordinated. Complete information regarding laboratory content can be found in Volume II (Detailed Course Outlines).

COURSE OUTLINE (Condensed Version)

COURSE TITLE HEMATOLOGY AND URINALYSIS

CREDIT HOURS 3 TERM OFFERED Fifth

2 LECTURES 1 Hour PER WEEK 1 LABORATORY 2 Hours PER WEEK

PREREQUISITES Mammalian Anatomy and Histology
Mammalian Physiology

COURSE OBJECTIVE AND APPROACH

To familiarize the student with the characteristics and techniques used in the study of vertebrate blood, including principles and practices of total and differential counts, coagulation, sedimentation, hemoglobin determinations, packed cell volume, blood grouping and other tests deemed important in animal science. The student should also have a comprehensive understanding of the kidney, its function and the parameters utilized to determine any abnormalities of the urine.

The anatomy and physiology of the cardiovascular and renal systems, their constituents and related body fluids should also be understood.

INSTRUCTIONAL METHODS

Scheduled lectures supplemented with films and other audio-visuals, along with laboratory periods involving instruction on the collection, preparation and examination of blood and urine, including those examinations and reactions utilized in diagnostic evaluations, characterized the instructional approach used in teaching this course.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours	Laboratory Periods
I. Introduction to Hematology	1	1
II. Erythrocytes	3	3
III. Leukocytes	4	2
IV. Thrombocytes	1	1/2
V. Spleen	1	0
VI. Hemopoiesis	1	1/2
VII. Erythrocytes in Disease	2	2
VIII. Plasma Proteins	1	
IX. Coagulation	1	
X. Lymph	1	
XI. Reticulo-Endothelial System	1	0
XII. Leukemias	1	0
XIII. Urinalysis	4	2
Totals	22	11

COURSE OUTLINE (Condensed Version)

COURSE TITLE INTRODUCTORY ECONOMICS (General Education Course)

CREDIT HOURS 3 TERM OFFERED Fifth

3 LECTURES 1 Hour PER WEEK

PREREQUISITES None

COURSE OBJECTIVE AND APPROACH

To provide the student with a basic understanding of economic concepts and principles and to present practical considerations and insights into major economic problems. Both macroeconomic and microeconomic approaches are analyzed using a minimal amount of mathematics. Orientation will be directed toward basic economic theory as it relates to the American economic system. A problem solving conceptual approach, stressing functional situations with which the technology oriented student can relate, will be utilized both in presentation and organization of ideas.

INSTRUCTIONAL METHODS

The student learning experience in this course is predicated on the use of scheduled lectures, recitation periods, the use of current literature, regularly assigned readings and audio-visual supplements.

TEXT

Gordon, S. et al. The American Economy: Analysis and Policy.

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours
I. Introduction to Economics	1
II. Resource Allocation Through Supply and Demand	3
III. Business Enterprise	3
IV. Costs, Prices and Output in Various Markets	2
V. Labor	3
VI. Natural Resources, Capital and Management	3
VII. The Developing Role of Government	2
VIII. The Consumer's Role	2
IX. The American Economy in Aggregate	3
X. Money Prices and Role of Banking	2
XI. Relating Policy to Problems	3
XII. Economics Viewed Internationally	3
XIII. Economic Growth	3
Total	33

COURSE OUTLINE (Condensed Version)

COURSE TITLE ANIMAL SCIENCE SEMINAR

CREDIT HOURS 1 to 3 (Usually 2) TERM OFFERED Sixth

LECTURES AND LABORATORIES Not Formally Structured

PREREQUISITES Academic background in research subject area

COURSE OBJECTIVE AND APPROACH

To provide an opportunity to complete an individual study project in some problem area of the student's major field of interest. This seminar may be completed as library research or as a laboratory plus library research project. The study is to be completed under the guidance of one or more of the faculty members.

The student is required to prepare a technical paper and to give an oral presentation representative of the research completed.

INSTRUCTIONAL METHODS

Under the guidance of a faculty seminar advisor, the student completes laboratory and/or library research in an approved seminar project. The preparation of a technical report and oral presentation of the seminar results add to the learning experience.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Total Hours	Laboratory Periods
I. Mechanics of the Seminar	3	Individual study-hours as required
II. Grading Criteria	1	
III. Interim Progress Reports	9	
IV. Oral Report	3	
V. Written Report	3	
VI. Comments	3	
Total	22	

COURSE OUTLINE (Condensed Version)

COURSE TITLE GENETICS (General Education Course)

CREDIT HOURS 3 TERM OFFERED Sixth

3 LECTURES 1 Hour PER WEEK

PREREQUISITES None

COURSE OBJECTIVE AND APPROACH

To endow the student with an understanding of basic genetics sufficient to enable the application of this science to the biological and animal science fields. In attaining the objectives of this course, consideration is given to cytological and environmental factors pertaining to Mendelian inheritance, gene theory, cytoplasmic phenomena, organizers, chromosomal aberration and mutation. The student is also expected to understand the interrelationships which genetics has established with cytology, evolution, and morphogenesis as it relates to the welfare of man and animals.

INSTRUCTIONAL METHODS

Recitation sessions, problem solving exercises, films, demonstrations and scheduled lectures comprise the instructional approach used for this course.

TEXT

Srb, A. M., R. D. Owen and R. S. Edgar. General Genetics.

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS	Class Hours
I. Origin and Development of the Gene Concept	1
II. Cell Structure and Function	2
III. Life Cycle	2
IV. Gene and Chromosome Behavior during Cell Division	2
V. Sex Linkage and Sex Determination	2
VI. Quantitative Inheritance, Multiple Alleles and Pseudoalleles	2
VII. Nature and Function of Heredity Material	4
VIII. The Nature and Cause of Mutations	2
IX. Genes and Metabolism	3
X. Genes and Development	3
XI. Behavior Genetics	2
XII. Extrachromosomal Inheritance	2
XIII. Population Genetics and Evolution	4
XIV. Advances in Genetics	2
Total	33

COURSE OUTLINE (Condensed Version)

COURSE TITLE ENGLISH COMPOSITION III (General Education Course)

CREDIT HOURS 3 TERM OFFERED Sixth

3 LECTURES 1 Hour PER WEEK

PREREQUISITES English II

COURSE OBJECTIVE AND APPROACH

An advanced course in English Composition developed to provide the student with further insight into the qualities and varieties of expository prose studied initially in the fundamental and intermediate courses of English Composition. Objectives include attempting to develop within the student an individualized, effective style which gives special attention to and emphasizes purpose, tone and audience. Additionally, this course is intended through reading and interpretation to develop an understanding and appreciation of poetry and drama.

INSTRUCTIONAL METHODS

The presentation of this course included writing of compositions, class discussions and selected reading assignments.

TEXT - None (see References, Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

		Class Hours
I.	Composition and Expository Prose	15
II.	Literature Appreciation	18
	Total	33

ANIMAL SCIENCE ELECTIVE COURSES

	Term Offered
Laboratory Animal Option	
Laboratory Animal Science II	Fifth
Laboratory Animal Diseases	Sixth
Technical Reporting	Fourth
Veterinary Assisting Option	
Animal Health	Fourth
Surgical Assisting	Fifth
Veterinary Science	Sixth
Unclassified Electives (Either Option)	
Food Sanitation and Inspection	Fifth
Histological Techniques	Sixth
Horse Management	Fourth

COURSE OUTLINE (Condensed Version)

(LABORATORY ANIMAL OPTION - ELECTIVE)

COURSE TITLE LABORATORY ANIMAL SCIENCE II

CREDIT HOURS 4 TERM OFFERED Fifth

3 LECTURES 1 Hour PER WEEK 1 LABORATORY 3 Hours PER WEEK

PREREQUISITE Laboratory Animal Science I

COURSE OBJECTIVE AND APPROACH

To provide a functional understanding of selected areas of research utilizing laboratory animals. These include the rather divergent specialties of gnotobiotic (germfree) technology, animal behavior and endocrinectomy surgical techniques.

Consideration is given to the biological uniqueness, research usefulness and future potential of gnotobiotic animals. The gnotobiotic section of the course should bring to the student an understanding of germfree equipment, microbiological monitoring techniques and anatomical, physiological and immunological profile data pertaining to germfree animals.

This course should also bring to the individual information relating to the functional aspects of animal behavior as well as patterns and systems of behavior and social relationships most frequently encountered in animal species. The effect of environment on laboratory animals is of particular importance.

Finally, the development of endocrine surgical techniques in laboratory rodents is expected of the student.

INSTRUCTIONAL METHODS

Instruction in this course is accomplished through lectures supplemented by guest speakers and pertinent audio-visuals. The laboratory sessions are utilized in the construction and maintenance of germfree isolator equipment and the development and practice of endocrine surgical techniques on laboratory rodents.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS	Class Hours	Laboratory Periods
A. Axenic Techniques and Gnotobiology Section		
I. Introduction to Gnotobiology . . .	1	*
II. Theory and Philosophical Aspects of Germfree Life	1	See Page 215
III. Essential Terminology (Definitions and Explanations)	1	
IV. Historical Aspects of Gnotobiology	1	
V. Classification of Gnotobiotic Animals (by microflora profile)	2	
VI. Germfree Isolator Equipment . . .	2	
VII. Methods of Sterilization of Germfree Supplies and Equipment . .	2	
VIII. Derivement, Maintenance and Shipment of Gnotobiotic Animals	2	

	Class Hours	Laboratory Periods
IX. Relevance of Gnotobiotic to Barrier Reared(SPF)Operations	2	
X. Morphological, Histological Gross Anatomical and Biochemical Profiles Fnotobiotic Animals	2	
XI. Some Immunological Characteristics of Gnotobiotic Animals	1	
XII. Determination of Germfree Status .	2	
XIII. Gnotobiotic Animals as Research Tools	1	
XIV. Gnotobiotic Research - Outlook for the Future	1	
B. Animal Behavior Section		
I. Introduction to Animal Behavior	1	
II. Behavior Patterns	1	
III. Systems of Behavior	1	
IV. Social Relationships	2	
V. Locality and Behavior	1	
VI. Effects of Environment on Laboratory & Domestic Animals .	2	
VII. Behavior in Dogs	2	
VIII. Behavior in Cats	2	
Totals . . .	33	11

* Due to the schedule of presentation, lecture content and laboratory exercises could not always be coordinated. Complete information can be found in Volume II.

COURSE OUTLINE (Condensed Version)

(LABORATORY ANIMAL OPTION - ELECTIVE)

COURSE TITLE LABORATORY ANIMAL DISEASES

CREDIT HOURS 3 TERM OFFERED Sixth

2 LECTURES 1 Hour PER WEEK 1 LABORATORY 2 Hours PER WEEK

PREREQUISITE Laboratory Animal Science I

COURSE OBJECTIVE AND APPROACH

To provide the student specializing in laboratory animal science with background and current information pertaining to disease conditions and remedial health practices relating to a variety of laboratory animal species.

The individual should also be aware of the occurrence of disease conditions and subsequent transmission in laboratory species, along with etiologic agents involved in the more important bacterial, viral and parasitic diseases of laboratory animals. An appreciation for the environmental, nutritional and clinical factors relating to control and/or elimination of diseases should also be forthcoming.

INSTRUCTIONAL METHODS

A series of specialized laboratory techniques dealing with diagnosis and microbiological monitoring of laboratory animals in breeding and research animal colonies are introduced. Film supplemented lectures and field trips to commercial breeding facilities and biomedical research laboratories are also used for instruction in this course.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS	Class Hours	Laboratory Periods
I. Introduction to Laboratory Animal Health	1	* See Page 219
II. Essential Terminology	1/2	
III. Disease Classification	1	
IV. Clinical Indications of Disease in Laboratory Animals	1	
V. Environmental Factors in Laboratory Animal Diseases	2	
VI. Apparent vs Inapparent Infection in Animal Colonies	1/2	
VII. Diseases of Laboratory Mice	2	
VIII. Diseases of Laboratory Rats	2	
IX. Diseases of Laboratory Hamsters	1	
X. Diseases of Laboratory Guinea Pigs	1	
XI. Diseases of Laboratory Rabbits	1	
XII. Diseases of Laboratory Cats	2	
XIII. Diseases of Laboratory Dogs	2	
XIV. Diseases of Laboratory Primates	3	
XV. Control and/or Elimination of Disease Conditions in Laboratory Animal Colonies	1	

	Class Hours	Laboratory Periods
XVI. Effects of Animal Quality on Laboratory Experimentation	1	
Totals	22	11

* Due to the schedule of presentation, lecture content and laboratory exercises could not always be coordinated. Complete information regarding laboratory content can be found in Volume II (Detailed Course Outlines).

COURSE OUTLINE (Condensed Version)

(LABORATORY ANIMAL OPTION - ELECTIVE)

COURSE TITLE TECHNICAL REPORTING

CREDIT HOURS 3 TERM OFFERED Fourth

1 LECTURE 1 Hour PER WEEK

PREREQUISITE Laboratory Animal Science I

COURSE OBJECTIVE AND APPROACH

To emphasize to the student the importance of technical literature in the biomedical research field. In accomplishing this objective the student is required to read and evaluate selected technical papers, and in addition received indoctrination and practice relating to library usage, data retrieval, writing of technical reports and verbal presentation of scientific data.

INSTRUCTIONAL METHODS

Class discussions are used to evaluate selected outside readings. Literature retrieval exercises are completed at the College Library. Writing practice, encompassing each aspect of the technical report, is completed outside of class.

TEXT

American Institute of Biological Sciences. Style Manual for Biological Journals.

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours
I. Introduction to Technical Reporting . . .	1
II. Elements of Technical Writing	2
III. Preparation of the Technical Report . . .	5
IV. Review and Evaluation of Technical Literature	2
V. Oral Presentation of Technical Information	1
Total	11

COURSE OUTLINE (Condensed Version)

(VETERINARY ASSISTING OPTION - ELECTIVE)

COURSE TITLE ANIMAL HEALTH

CREDIT HOURS 3 TERM OFFERED Fourth

2 LECTURES 1 Hour PER WEEK 1 LABORATORY 2 Hours PER WEEK

PREREQUISITES Applied Microbiology)
) Recommended
Zoonoses)

COURSE OBJECTIVE AND APPROACH

To provide veterinary assistant and animal husbandry students with a familiarity in large animal diseases, including etiology, symptoms and prevention. It is desirable that the student become aware of management and other practices necessary to prevent animal diseases and to recognize the early symptoms of illness in domestic animals. Development of the ability to determine what constitutes normality and illness in each species is important.

INSTRUCTIONAL METHODS

Demonstration, lectures, and practice exercises at the College Farm are used for instructional purposes. The laboratory exercises are designed to give the student an opportunity to apply the principles learned in lecture to a practical livestock situation.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours	Laboratory Periods
I. Physical Diagnosis of Variations from the Normal State of Health .	3	* See Below
II. Diseases of the Digestive Tract . .	4	
III. Diseases of the Respiratory System.	3	
IV. Metabolic Disorders	3	
V. Diseases of the Urinary Tract . .	1	
VI. Diseases of the Reproductive Organs	4	
VII. Diseases of the New Born and Young	1	
VIII. Mastitis	1	
IX. Diseases of the Integumentary System	1	
X. Vaccination Schedules for Various Species	1	
Totals. . .	22	11

* Due to the schedule of presentation, lecture content and laboratory exercises could not always be coordinated. Complete information regarding laboratory content can be found in Volume II (Detailed Course Outlines).

COURSE OUTLINE (Condensed Version)

(VETERINARY ASSISTING OPTION - ELECTIVE)

COURSE TITLE SURGICAL ASSISTING

CREDIT HOURS 2 TERM OFFERED Fifth

1 LECTURE 1 Hour PER WEEK 1 LABORATORY 2 Hours PER WEEK

PREREQUISITES Mammalian Anatomy and Histology
Anesthetic and Radiologic Techniques

COURSE OBJECTIVE AND APPROACH

To supply the student with knowledge and practical ability to assist the veterinarian with surgical procedures. Considerable emphasis will be placed on pre-operative patient preparation and post-surgical care.

INSTRUCTIONAL METHODS

One lecture period weekly will cover the basic surgical principles. Laboratory sections will involve groups of six or seven students each week actually assisting in patient preparation and surgical assisting. Intensive and routine post-operative care will be conducted by this group. The procedure will be recorded on videotape and the tape will be shown and discussed by the remainder of the class during the following week.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours	Laboratory Periods
I. Introduction	1	0
II. Sterile Technique.	4	3
III. Surgical	6	8
Totals . . .	11	11

COURSE OUTLINE (Condensed Version)

(VETERINARY ASSISTING OPTION - ELECTIVE)

COURSE TITLE VETERINARY SCIENCE

CREDIT HOURS 3 TERM OFFERED Sixth

3 LECTURES 1 Hour PER WEEK

PREREQUISITE Clinical Management recommended

COURSE OBJECTIVE AND APPROACH

To encompass essential functional areas and situations relating to veterinary clinical practice. The contents of this course should provide the student desiring employment as a veterinarian assistant with information pertaining to kennel management, breeding obstetrics, pediatrics, dental hygiene, wound management, bandaging, emergency first aid, practical nutrition of sick and healthy animals, client relationships and various other operational features involved in assisting a practicing veterinarian in a veterinary hospital or clinic situation.

INSTRUCTIONAL METHODS

Instructional methods in this course include primarily a lecture-discussion type approach without rigidly structured parameters. The course is taught by a trained veterinarian with experience in hospital-clinical practice. Since this course is taught in the final term of the second year, it is intended to maximize the effectiveness of the student anticipating employment immediately after graduation as a veterinarian assistant.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

		Class Hours
I.	Infectious Diseases	10
II.	First Aid	4
III.	Principles of Animal Care	5
IV.	Small Animal Reproduction	3
V.	Exotic Animals	4
VI.	Dentistry	1
VII.	Client Relationships	4
VIII.	Unclassified General Topics	2
	Total	33

COURSE OUTLINE (Condensed Version)

(UNCLASSIFIED ELECTIVE COURSE)

COURSE TITLE FOOD SANITATION AND INSPECTION

CREDIT HOURS 4 TERM OFFERED Fourth

2 LECTURES 1 Hour PER WEEK 1 LABORATORY 4 Hours PER WEEK

PREREQUISITE Applied Microbiology

COURSE OBJECTIVE AND APPROACH

To provide the student with a background in meat inspection enforcement procedures which emphasizes the functional aspects of inspection and the relationship of sanitation and inspection to public health. Principles and practices employed in food and meat processing plant sanitation, including water supply, waste disposal and control of harmful animal pests and microbes, should also be understood. The epidemiology of water, milk, food and meat-borne diseases is emphasized throughout the course.

INSTRUCTIONAL METHODS

Lecture periods are utilized to outline principles of food sanitation and inspection and present other factual information. In addition to staff instructors, guest speakers from the inspection service also contribute to the course.

Laboratory sessions serve to illustrate and enlarge upon inspection techniques and relationships to management and operational practices found in the food industry. The instructional process is further emphasized through class discussion, training films, and the use of 35 mm slide sets, as well as field trips to dairy, food and meat processing plants.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS	Class Hours	Laboratory Periods
I. Relationship of Food Inspection to Public Health	1	* See Page 230
II. Inspection Enforcement Procedures & Techniques	1	
III. Compliance with Regulations	1	
IV. Water Supply and Water Waste	1	
V. Washing and Sanitizing Food Equipment	1	
VI. Sanitary Production of Market Milk	1	
VII. Epidemiology of Food-borne Diseases	3	
VIII. Insect and Rodent Control	1	
IX. Food Inspection Reports	1	
X. Meat Hygiene and Inspection		
1. General	3	
2. Meat Inspection Programs in Existence in the U. S.	1	

	Class Hours	Laboratory Periods
3. Elements of Meat Hygiene . .	2	
4. Meat Inspection Laws, Regulations, Meat Inspection Division Handbook and Role of the Lay Meat Inspector	1	
5. Inspection Techniques and Procedures	4	
Totals . . .	22	11

* Due to the schedule of presentation, lecture content and laboratory exercises could not always be coordinated. Complete information regarding laboratory content can be found in Volume II (Detailed Course Outlines).

COURSE OUTLINE (Condensed Version)

(UNCLASSIFIED ELECTIVE COURSE)

COURSE TITLE HISTOLOGICAL TECHNIQUES

CREDIT HOURS 2 TERM OFFERED Sixth

0 LECTURES 0 Hours PER WEEK 2 LABORATORIES 2 Hours PER WEEK

PREREQUISITES Mammalian Anatomy and Histology

COURSE OBJECTIVE AND APPROACH

A course designed to train students in the procedures and methodology involved in the processing of animal tissues and the preparation of histological slides utilized in studies of microanatomy and histopathology.

Representative techniques in which proficiency must be developed by the student includes collection, preserving, sectioning and staining of normal and diseased tissue. Instruction is also given in the use of the autotechnicon and freezing microtome.

INSTRUCTIONAL METHODS

The structure of this course excludes formal scheduled lecture periods and places, instead, emphasis on laboratory indoctrination and practice.

Due to the present deficiency of histological technicians in hospital, medical and research laboratories, an effort is made to influence the student to select this unclassified elective course as part of the curricular experience.

TEXT - None (See References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

		Class Hours	Laboratory Periods
I.	Introduction to the Histological Laboratory . . .	0	1
II.	Maintaining Efficiency in the Laboratory	0	1
III.	Collecting Tissue	0	2
IV.	Fixing Tissue	0	1
V.	Dehydrating Tissue	0	1
VI.	Clearing Tissue	0	1
VII.	Infiltrating Tissue	0	1
VIII.	Embedding Tissue	0	2
IX.	Sectioning Tissue	0	5
X.	Mounting Tissue	0	1
XI.	Staining Tissue	0	4
XII.	Coverslipping Slides	0	1
XIII.	Processing Frozen Sections . .	0	1
	Total	0	22

COURSE OUTLINE (Condensed Version)

(UNCLASSIFIED ELECTIVE COURSE)

COURSE TITLE HORSE MANAGEMENT

CREDIT HOURS 3 TERM OFFERED Fourth

PREREQUISITES None

COURSE OBJECTIVE AND APPROACH

To acquaint the student with the selection, breeding, training, care, housing and management of light horses. Information relating to the judging and showing of horses is also included. Special emphasis is placed on the evaluation of equine breeds and physical weaknesses attributed to each breed. Equine diseases (bacterial, viral and parasitic) are covered in detail.

INSTRUCTIONAL METHODS

To supplement and, in some instances, in substitution for the lecture sequence, the instructional methods relating to this course include field trips to horse breeding farms, demonstrations relating to the showing and judging of horses and selected visual aids.

TEXT - None (see References - Volume II)

COURSE CONTENT (Brief Topical Outline)

MAJOR DIVISIONS

	Class Hours
I. Introduction	2
II. History of Light Horse Breeds	3
III. Equine Phenotype	4
IV. Unsoundness of the Horse	5
V. Recommended Housing for Horses	3
VI. Proper Care and Maintenance of the Light Horse	6
VII. Equine Diseases	10
Total	33

CHAPTER V

ECONOMIC - COST CONSIDERATIONS OF THE PROGRAM

In previous chapters of this report, an attempt has been made to describe the development of the Animal Science program "basically" in terms of growth and change. Acceleration in student enrollment and evolvement of the curriculum toward increased quality and specialization resulted in, among other things, the need for additional and more fully qualified professional staff; larger, customized laboratory facilities; more equipment and instrumentation designed specifically, or adaptable for use in this type of technical training. An enlargement of professional ancillary services required to support the increasing instructional program was also necessitated.

As the academic, curricular and physical demands necessitated by expansion and improvement of the program were responded to, an equivalent financial commitment from Delhi College was also essential. The rapidly multiplying operational costs concomitant with the continued development of this curriculum were shared during the 1965-1969 period with funding from the United States Office of Education. Since the completion of that contract, total financial support, in steadily increasing amounts, has been supplied from the fiscal budget of this College.

Some of the "high cost factors" which have resulted in the Animal Science operation being classified as the "most expensive technical program on this campus" are enumerated in the following discussion.

1. Professional Staff

An extensive degree of selectivity and screening was considered essential in acquiring the faculty and ancillary professional staff to instruct in this program. The unique academic experience and human factors (personality), qualifications which this department required of individuals selected to teach in the Animal Science program reduced the number of available applicants, thus making the procurement of professional personnel somewhat a problem area. The academic commitment of this curriculum necessitated that graduates of accredited colleges of veterinary medicine, with broad experience backgrounds, be available to instruct the veterinary assistant oriented courses. Also, that educationally qualified individuals with extensive experience in biomedical research and related professional fields be engaged to teach the laboratory animal specialty courses.

The professional personnel in this department had to have a knowledge of their subject specialties sufficient to enable the teaching of concepts, principles, techniques and other applied aspects with the complete confidence which comes from a working familiarity with this technology.[3]

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[3] Criteria for Technician Education. U. S. Department of Health Education and Welfare. November 1968.

The utilization of lesser qualified personnel in the teaching of specialized skills and technical courses was not recommended if entry level employment qualifications were to be attained by the graduate of this program.

The academic and experience credentials required of the departmental staff assisting in instruction of the Animal Science curriculu, necessitated concurrently the establishment of a salary base which reflected the qualifications and professional attainments of these individuals, all of whom were education and involved in the veterinary medical and/or biomedical research professions prior to accepting positions at this College.

It was estimated that salary schedules for Animal Science faculty consistently ranged from 15% to 25% higher, on an equivalency basis, than the salaries of those in non-technical teaching positions. Non-teaching, paraprofessional personnel in this department, because of the scientific skills and competence required in support of the instructional process were compensated at a rate which approximated 10-15% more than the campus average for individuals in this classification.

In addition to salaries, fringe benefits in the form of non-contributory retirement programs, medical and life insurance benefits and others, added an additional 25% to the total compensation package of the individual staff member. The services of professional and paraprofessional Animal Science personnel constituted a substantial budget expenditure, particularly for a two-year college; but without the classroom and laboratory involvement of highly competent and experienced professionals, the growth and quality achieved in the development of this program would otherwise not have been possible.

II. Facilities

Effective technical preparation of the student in this program was dependent, not only upon the quality of instruction, but also upon the availability of facilities appropriately designed and equipped to enable the development of skills, techniques and proficiencies required by the individual planning to enter one of the animal science professional areas.

In this regard, the building which became the Animal Science Center in 1966, was procured by the College and thereafter received an lamost complete interior re-design and renovation prior to its use for instructional and administrative purposes. In altering this complex for teaching laboratory use, the costs involved in providing a facility with the functional utility and flexibility required for effective instruction, were constantly under review. Specialized laboratory spaces essential to the requirements of the curricular program proved to be particularly expensive to provide. For example, the Radiologic Laboratory required the installation of lead shielding in the wall, ceiling and floor areas and the insertion of radio protective glass in the viewing window. Both the Vivarium (animal holding area) and the Surgical Laboratory had to be outfitted with environmental control systems (air conditioning, ventilating and air filtering). Additionally, in the Vivarium sheltered dog runs with radiant heated cement floors (for winter usage) were required.

The outfitting and maintenance of ancillary areas within the Animal Science Center, including Administrative space (receptionist and faculty offices), Preparation and Sterilization Rooms, as well as storage areas, which were essential in the support of instruction, also had to be computed into the total facilities renovation and operational costs.

Routine laboratory and office furnishings, inclusive of student work tables, laboratory storage cabinets, desks and other items, needed to outfit instructional and administrative areas, had to be selected and approved prior to the final allocation of funds required for the renovation of this instructional complex.

In all laboratory areas involved with instruction and development of applied techniques, the general philosophy for facilities planning was to design and equip the teaching laboratory as closely as possible to simulate actual field conditions. The resultant expenditures involved in this "simulation" were more than justified by the added effectiveness and conceptual applications available to the students.

III. Equipment

Both laboratory equipment and facilities are a major element of the cost of a technician training program and they are indispensable if the training objectives are to be met.[3] This statement was firmly authenticated as far as the Delhi Animal Science curriculum was concerned. It was not until funding from the United States Office of Education in 1965-66 provided more than $38,000 for the purchase of essential equipment, that this program was able to improve and expand in both a curricular and instructional direction. Thereafter, additional allocations for this purpose, in the amount of $142,000, were obtained by virtue of equipment grant awards from both Federal and State-Federal matching fund sources. These contributed materially to a continuation of the development of this curriculum.

Cost of equipment was reflected in two directions as far as this program was concerned. Initially, many of the items required for effective instruction carried an "elevated" unit price and were usually purchased in very limited quantities. Secondly, many of the less expensive items were required on a "multiples basis," sometimes one per student, to enable maximum participation and required skills development.

Examples of some of the equipment used in this program which, due to economic factors, was available only on a limited numbers basis, included the Physiograph "6", Autotechnicon, Coulter blood cell counter, fluorescent antibody microscopes, high vacuum autoclave, freeze drying apparatus, refrigerated centrifuge, rotary microtomes, Millipore filter and others. A partial listing of the "multiples items" indicated in the second classification included student microscopes, hemacytometer kits, anatomical skeletons, endocrinectomy surgical equipment, gnotobiotic isolators, table top centrifuges and a variety of additional clinical and animal laboratory equipment.

The Animal Science program has been well supplemented in the past with funds which were utilized for the purchase of necessary instrumentation; even so, due to the continued improvement in the quality of instruction, the need for additional equipment and specialized items of instruction continues.

The high level of competence which has been developed in the graduates of this program was due "in large measure" to the availability of facilities and equipment sufficient to provide simulated "on the job" conditions with which the student could relate throughout the two-year period of training. The establishment and maintenance of this type of an "environment for learning" has, as is characteristic of medically related programs, demanded extensive amounts of financial support and will continue to do so.

VI. Operating Costs

One of the most important factors relating to effective administration of this curriculum was a budgetary responsiveness to operational expenditures; those costs which were present on a recurring basis during each year of the program.

Without appropriate operational support funds, professional staff, facilities and equipment could not have been utilized properly or to fullest potential in the process of instruction.

The Animal Science program, due to the diverse, yet specialized implications of the curriculum, was particularly dependent upon fiscal recognition by this College for essential operational support.

Primary recurring expenses concomitant with this program are classified in the following manner:

1. Animal Care - The animal vivarium in the Animal Science Center contained eight different species of animals which required continuous maintenance on a year around basis. Part of the necessary care was completed by students from the Laboratory Animal Science I course who were assigned to vivarial practice as part of the course requirement. During other periods of the regular school year (including

weekends) vivarial work was completed by work-study students (see Chapter II 4-c page 41). During intervals classified as holidays and summer vacation times, necessary maintenance was completed through the combined efforts of work-study and temporary service personnel.

2. Vivarial Support - Also essential to the health, well being and maintenance of animals housed in the vivarium, and a required expenditure in the operating budget, were continuous supplies of specialty animal food and bedding. Other ancillary support needed for this operation included the availability of supplies with which to provide the high quality sanitation program required in this area.
3. Animal Purchases - Funds were needed on a routine basis for the purchase of live animals which were procured prior to the beginning of each school year. These included primarily dogs, cats and rabbits. As the result of possible toxification effects and unpredictability of response resulting from periodic anesthesia, these species were retained in the vivarium for instructional use for only one year. At the conclusion of this period they were discharged as pet or companion animals and replaced the following year.
4. General Supplies - An extensive number of items classified generally as supplies, had to be replaced

or replenished on a continuing schedule. A partial listing includes hypodermic syringes and needles; pipettes, beakers and other glassware; a wide variety of biologicals, vaccines, drugs, antibiotics and other medicines; radiologic film; anesthetics (both inhalant and injectable); chemical reagents and a large number of others which are used in support of instruction in clinical, surgical and laboratory animal oriented courses.

5. Instructional Models - The availability of instructional models, such as the canine cadaver, which had been enbalmed and the circulatory system "double injected," was essential for dissection in the Mammalian Anatomy course. On the basis of two students per cadaver, approximately forty cadavers were needed for the completion of this exercise. At a cost approaching $15.00 per animal, this constituted a considerable instructional expense.

6. Equipment Replacement - Budgetary allowances were required each year for replacement of equipment which became "worn out," broken or had only single usage potential. An example of equipment that could be used only once included the plastic chambers from gnotobiotic isolator units, which, for maximum instructional benefit in construction of the isolator was renewed nearly every time germfree techniques was taught (part of Laboratory Animal Science II).

Examples of the other two replacement criteria included the disposal and reordering of plastic rodent cages which became cracked and/or broken occasionally in the animal maintenance operation. Hemacytometers were frequently replaced due to accidental breakage, as were a variety of other fragile glassware items. Accidental breakage resulted primarily from maximum student usage during the completion of laboratory exercises.

7. Equipment Maintenance and Repair - In order for technical equipment and instruments used in the instructional program to be retained at an effective operating level, it was necessary to implement a schedule of preventative maintenance and repair. This was done to the extent of the budgetary funds available for this purpose. It was important that equipment such as microscopes, microtomes, balances and scales, radiographic equipment, clinical laboratory instruments and various other items, including office equipment, receive the attention necessary to keep them in prime operating condition.

8. Travel

   a. Staff - Limited funds were available from the departmental budget sufficient to enable occasional attendance by the professional staff at local and/or regional scientific meetings, for the purpose of professional improvement. Additional travel funds were also obtainable during the 1965-1969 period from the United States Office of Education contract.

b. Field trips - Since the early years of the Animal Science program (prior to 1965) when class sizes were extremely limited, funds for field trips have not been available. In most instances, when trips to research laboratories or other facilities were planned they were subsidized (on a voluntary basis) by the individual student.

c. Off-Campus Instructional Facilities - It was pointed out in the discussion of Facilities (Chapter III), that the College Farm, located approximately one and one-half miles from the main campus, was also used for instructional purposes in a limited number of courses. In order that students could all arrive at scheduled laboratory sessions simultaneously, a bus (operated by the College) was engaged to provide transportation. This service, which had to be paid for, was classified as a charge-back item to the divisional budget.

CHAPTER VI

IMPORTANCE OF THE STUDY

Background

The awarding of the United States Office of Education grant to State University of New York Agricultural and Technical College at Delhi, in 1965, provided for the employment of professional consultants to make a follow-up study of graduates of the Animal Science Technology program. Consequently, Professor Joe P. Bail and Professor William E. Drake, Department of Education, New York State College of Agriculture at Cornell University, were engaged to do this work.

A prime consideration in awarding the training program was the provision for systematic follow-up of all graduates of the program. This included the students who graduated with the A.A.S. degree and who were either employed or continuing their formal education, and employers. Information gained from this study would presumably be useful in evaluation of all aspects of the program, but especially in terms of student selection, student placement in jobs or in advanced schools, relevance of training to type of job served, and progress of students meeting occupational needs in the areas trained.

Purpose of the Study

What do students who complete the training programs do upon graduation? How relevant, in the eyes of employers and employees was the training received to the future jobs and aspirations of those completing the program? What changes in curriculum, staffing, facilities, and supporting services do the data from these groups suggest? These and other questions were in the minds of the Delhi staff and the consultants in conducting the follow-up study.

Specific Objectives

An attempt was made to answer the following specific questions in this study.

Graduates of the Program

1. To what degree are graduates satisfied with their employment situations? (Job Satisfaction)
2. What are the factors contributing to job satisfaction or dissatisfaction?
3. To what degree do students feel adequately prepared for the jobs in which they are working?
4. What do graduates consider to be the needed skills, knowledges and abilities for the jobs in which they are employed?
5. To what degree do the graduates feel that the facilities of the training program are adequate?
6. Do the students aspire for mobility in their area of employment?

Employers of Program Graduates

1. To what degree are employers satisfied with graduates of the program?
2. To what degree do employers feel that the graduates are adequately prepared for their employment?

3. What do employers consider to be the needed knowledges, skills and abilities for the jobs of their employees who are graduates of the program?
4. Others.

General

1. Is the curriculum adequately preparing students for the jobs they are entering?
2. Are the facilities for instruction adequate in terms of the jobs graduates are entering?
3. Are graduates working in jobs that are appropriate to their preparation?
4. Is there consensus among the graduates concerning the adequacy of their preparation?
5. Is there consensus among employers?
6. Is there consensus between employers and employees concerning needed training and adequacy of training?
7. Do preparation needs differ for males and females?
8. What additions and/or changes are needed in the facilities and equipment of the curriculum?
9. What are the needed changes in the curriculum?

Assumptions

The following assumptions were made in the study:

1. That students can reflect upon their training program after being on a job for a minimum of six months.

2. That employers can reflect upon the knowledge and ability of students after they have been on the job for a period of six months.

3. That appropriate instruments can be developed that will provide opportunity for employees and employers to reflect upon the training received.

4. That a sufficient number of valid responses can be secured to the instrument by a mailing to former students and current employers.

METHODOLOGY

Population and Sample

Population

The population of follow-up study consists of all graduates who completed the Animal Science program in the years 1963 to 1968 inclusive and all employers of graduates employed at the time of the follow-up. The 1963-64 graduates are not included in this report because of the limited number of students in that class and the fact that the developmental research project had not yet been funded when those students were at Delhi. The 1969 graduates are likewise excluded because they have not been employed or engaged in further education for a long enough period of time to provide valid responses.

Sample

The sample for the study was the entire population of graduates and the employers of all graduates at the time of the follow-up study. Graduates pursuing further education were included in an attempt to obtain data concerning the adequacy of training received at Delhi in relation to continued education. The entire population was used in an effort to provide a graduate and employer sample of meaningful size.

Table I presents a summary of the study population by year of graduation. Employed graduates made up 65 percent of the total graduate population and students pursuing further education constituted the remainder, or 35 percent. Responses were obtained from 110 graduates, or 66 percent of the students graduating in the years 1965 to 1968 inclusive. Responses were obtained from 39 employers of graduates in jobs, which is 36 percent of all employers. The trend in number of graduates during the four year period of 1965 to 1968 is upward. And although the 1968 graduating class is slightly smaller in number than the 1967 class, projected enrollments indicate increased numbers of graduates in the years ahead.

TABLE I

SUMMARY OF FOLLOW-UP STUDY POPULATION CLASSES OF 1965 TO 1968 INCLUSIVE

	1965		1966		1967		1968		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Total number of graduates	26	-	35	-	54	-	51	-	165	-
Number of graduates placed in jobs	19	73	25	71	37	67	27	53	108	65
Number of graduates continuing education	7	27	10	28	17	31	24	47	58	35
Number of graduates placed in jobs who responded to the follow-up questionnaire	8	44	17	68	28	76	20	75	73	68
Number of graduates continuing education who responded to the follow-up questionnaire	6	86	6	60	13	76	12	50	37	64
Total number of graduates responding to the follow-up questionnaire	14	54	23	66	41	75	32	63	110	66
Number of employers respondin to follow-up of employed graduates (as identified by graduates)	3	37	8	47	17	60	11	55	39	53

CONSTRUCTION OF DATA GATHERING INSTRUMENTS

To carry out the purposes of the follow-up study it was essential to design data gathering instruments which would (1) provide those data needed to describe the nature and conditions of graduate employment or pursuit of further education; (2) relate those conditions to the Delhi program, and (3) provide graduates and their employers an opportunity to appraise the adequacy and need for the training received.

A number of the graduates pursue further education after graduation from Delhi. An instrument was needed which would allow those graduates to respond concerning the relationship of their training at Delhi to their continued education.

In order that graduates and employers of graduates might indicate their perceptions of adequacy and need for training received, it was essential to describe the intent or objectives of the Delhi program as completely and accurately as possible. The initial step in designing the survey instruments consisted of a careful review of the general purposes of the Animal Science Technology Program and the specific objectives and content for each course in the total program. Data relating to general purposes and usable in describing the nature and conditions of graduate employment were obtained in Section I of the questionnaires.

The specific objectives and content of the courses making up the program were stated in terms of knowledges or abilities which students had opportunity to acquire in the program. These knowledges or abilities were categorized into five content areas as follows:

Area I - General

Area II - Anatomy, Physiology and Histology

Area III - Animal Care and Nutrition

Area IV - Parasitology, Hematology, Pathology and Food Inspection

Area V - Scientific Instrumentation and Laboratory Equipment

The resulting data gathering instrument consists of two Sections. Section One gathers general information about the respondent and conditions of his employment or continued education. Section Two asks the respondent to rate knowledges or skills in terms of need and adequacy.

Schedule A - Employed Graduates[1]

Schedule A (the follow-up questionnaire for employed graduates) included the two sections discussed above. Section One gathers specific data concerning job title, time in present job, degree of qualification and job satisfaction. Section Two is designed to obtain the employed graduates perception concerning need for the training received at Delhi. This is accomplished with a three point scale for each knowledge and ability ranging essential, desirable and unnecessary. The employed graduate is also asked to respond concerning adequacy of training by responding to a five point scale for each knowledge and ability. This scale includes superior, adequate, inadequate, not available, and does not apply.

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[1] See Appendix A-1

Schedule A-1 - Graduates Pursuing Further Education[2]

Schedule A-1 (the follow-up questionnaire for graduates pursuing further education) also contains two sections of the basic questionnaire design. Section One gathers general information concerning the institution where the graduate is enrolled for continued education, major field of study, transfer status, degree being pursued, time of decision to transfer and occupational aspiration.

Section Two uses the identical list of knowledges or abilities which is used in Schedule A. However, the graduate pursuing further education is asked to respond to the adequacy of training in the knowledges or abilities as related to present educational objectives. The respondents are asked to make their rating on a five point scale ranging superior, adequate, inadequate, and beneficial.

Schedule B - Employers of Graduates[3]

Schedule B (the questionnaire for employers of graduates currently in jobs) also contains the general information section and knowledges and skills section as do the other basic schedules. In Section One employers are asked to respond concerning job titles of employee(s) duties and responsibilities assigned, degree of qualification and criteria used to advance or promote employees. Section Two of Schedule B for employers is identical to Section Two of the employee schedule. The employer is asked to respond to the same five content areas listed in the form of knowledges or abilities. Employers are also asked to rate the knowledges or abilities concerning need for training and adequacy of training received by their employee(s). They were asked to make these ratings using scales identical to those used in Schedule A - the employee questionnaire.

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[2] See Appendix A-3

[3] See Appendix A-2

PRETESTING OF INSTRUMENTS

Two activities were carried out to pretest the instruments and to determine their adequacy. First a draft of the instruments was presented to members of the Advisory Council for the Animal Science Technology program. This advisory group is made up of veterinarians and animal scientists and the individual members were considered eminently qualified to react to the appropriateness and technical subject content of the questionnaire.

Secondly, the three schedules were administered to a limited number of respondents in each of the three respective subpopulations: employed graduates, graduates pursuing further education and employers of graduates currently holding jobs. This pretest with sample respondents was done using a personal interview technique. The respondents were asked to respond to the respective schedules and also raise any questions they might have concerning written directions, specific items in the questionnaire, or other matters concerning the schedules which were not clear to them.

The schedules were revised, as indicated by the pretest, to facilitate maximum understanding on the part of respondents. Schedules A, A-1 and B were then put in final form and printed. Schedules were also coded for punching on IBM cards.

DATA COLLECTION

The data for the follow-up study were collected from graduates and employers of graduates through the use of self-administered mail questionnaires. Student personnel records at Delhi made it possible to identify the addresses of graduates employed and those pursuing further education. Questionnaires were sent to the respective graduating classes approximately six months after their date of graduation from Delhi. This delay was to provide time for becoming employed or established in a program of continued education.

It was a purpose of the follow-up to gather data from immediate supervisors of the employed graduates. Respondents having this relationship with the employed graduates were considered to be most knowledgeable concerning the need and adequacy of the training program. To obtain the names of the immediate supervisor for each employed graduate, a posted return card was enclosed with each graduate's questionnaire. The cover letter requested that the graduate complete the card by writing in the name of the immediate supervisor. Using this procedure it was possible to identify those individuals named by employed graduates as their immediate supervisors. Upon receipt of the cards from employed graduates, Schedule B (the employer questionnaire) was sent to the immediate supervisor named.

After a reasonable response time had been allowed, follow-up letters and questionnaires were mailed to the non-respondents in each of the three populations - employed graduates, employers (immediate supervisors) of employed graduates and graduates pursuing further education.

ANALYSIS OF DATA

Responses from employed graduates, employers and graduates pursuing further education were coded on the respective questionnaires and then key punched on IBM 80-column computer cards. The data were tabulated and summarized as to marginal frequencies and percentages.

Those data obtained from Section I of Schedule A (employed graduate questionnaire) were summarized by year of graduation. Tables II through X and XII indicate employer responses concerning qualifications of graduates and means of providing for job advancement.

To determine graduate and employer appraisals of training program need and adequacy, their responses to Part II Schedules A and B were summarized as to marginal frequencies. These data are tabled by rank order and percentages in parallel columns in Tables XIII through XXII and provide for a comparison of employer-employee responses concerning both adequacy and need for training received at Delhi.

Responses of graduates pursuing further education were also summarized as to marginal frequencies. These data appear in Tables XXIII through XXVII. These data are placed by rank order and percentages and indicate graduate appraisal of training as related to objectives in continuing education.

General information concerning employed graduates is summarized in Tables XXVIII through XXX. These tables present data concerning semester hours transferred from Delhi, time of decision to pursue further education, type of institution and type of degree being pursued.

FINDINGS

The findings of the study are based upon the follow-up of members of the classes of 1965, 1966, 1967, and 1968. The 1968 class was followed up beginning January 1, 1969, and completed in May 1969. Since the 1969 class is just now completing about six months on the job or the first term in advanced education, it is not included in the current report. The classes of 1963 and 1964 were also followed up but because of the small number of students and the fact that the developmental research project was not yet funded, they are excluded from this report.

General Information, Employed Graduates

Information by years of graduation, sex, and age of students is presented in Tables II and III. Seventy-three of the 108 graduates completed the questionnaire from the years 1965 to 1968. Of these 73, 69 were usable. Females employed outnumbered males by better than 6 to 1. The large majority of the graduates were 20 or 21 years of age when they accepted employment.

TABLE II

NUMBER OF STUDENTS IN GRADUATING CLASSES BY YEAR AND SEX, COMPLETING FORM A

Year	Male	Female	Total
1965-66 (combined)	3	20	23
1967	2	24	26
1968	3	17	20
Total	9	60	69

TABLE III

AGE DISTRIBUTION OF ALL EMPLOYED GRADUATES BY YEAR OF GRADUATION

Year	AGE						Total
	19	20	21	22	23	24 and over	
1965-1966 (combined)	2	8	7	5	0	1	23
1967	1	13	9	1	1	1	36
1968	0	11	6	1	0	2	20
Totals	3	32	22	7	1	4	69

Fifty-five of the sixty-nine students accepting employment agreed that the job taken was the kind of work prepared for while at Delhi. (See Table IV)

TABLE IV

JOB PREPARATION AND JOB ACCEPTED (IS THIS THE KIND OF WORK YOU PREPARED FOR AT DELHI?) (By Year of Graduation)

Response	1965 and 1966 (combined)	1967	1968	Total
Yes	19	21	15	55
No	4	5	5	14

Fifteen or just over twenty percent said that the job secured was not related to the training program. Or, in other words, approximately four out of every five employed students actually were making use of the training received in their current job.

One criterion used in following up students was to wait until six months had elapsed since graduation before mailing the instrument. As shown in Table V, a majority of students indicated they had been on the job six to twelve months (54%). Another 36 percent had been on the job less than six months. Apparently a high percentage of students were placed immediately after graduation or within a three month period.

TABLE V

TENURE IN PRESENT JOB TITLE
BY YEAR OF GRADUATION

	1965 and 1966 (Combined)	1967	1968	Total
Under 3 months	5	5	2	12
3-6 months	2	7	4	13
6-12 months	13	13	12	38
1-2 years	3	0	2	5
2-3 years	0	1	0	1
Over 3 years	0	0	0	0

Job Titles Held by Graduates

A classification of job titles into four major categories was decided upon by the project staff and the evaluaters. These were: Animal Laboratory Technician, Veterinary Assistant, Biomedical Technician, other Technician, and lastly, all others.

The primary basis for these classifications was the location of the job held by employees. Brief descriptions of these categories are as follows:

Animal Laboratory Technician - Positions in pharmaceutical firms or other businesses where small animals are used in research work.

Veterinary Assistant - An individual working directly with a veterinarian who is generally in private practice.

Bio-medical Technician - Persons employed in medical centers or schools, hospitals, or other laboratories where training in bio-science is required.

Other Technicians - Positions classified as technical in nature, generally involving work with professionals in such areas as food, milk, or plant inspection, often times in Federal or state agencies.

All others - Any technical, skilled, or managerial position assumed by graduates.

The actual job title definitions correspond closely to those found in DOT (Dictionary of Occupational Titles, 1965, Vol. 1, Third Edition, U. S. Department of Labor, Washington, D. C.

As shown in Table VI, the predominant job held by graduates was that of Veterinary Assistant. Next with equal numbers were Animal Laboratory Technician and Bio-medical Technician. Just under 25 percent were filling other technician positions and all other jobs. It is interesting to note that all Veterinary

Assistants were female, keeping in mind that 61 of the 69 employees were also female.

TABLE VI

JOB TITLES HELD BY GRADUATES BY SEX AND YEAR OF GRADUATION

Job Title	1965 & 1966 (combined)		1967		1968		Totals	
	Male	Female	Male	Female	Male	Female	Male	Female
Laboratory Technician	1	1	1	6	1	5	3	12
Veterinary Assistant	0	7	0	9	0	5	0	21
Bio-Medical Technician	0	6	0	3	0	3	0	12
Other Technicians	2	4	0	2	2	2	4	8
All others	0	2	1	4	0	2	1	8

Qualification of Employees

Based upon the responses of the graduates who are employed, over 50 percent say they are well qualified and another 35 percent say they meet minimum qualification for the job they now hold. Table VII presents a summary of the classes from 1965 to 1968 inclusive.

TABLE VII

DEGREE OF QUALIFICATION TO CARRY OUT THE SPECIFIC DUTIES OF JOB NOW EMPLOYED IN - BY YEAR OF GRADUATION

Degree of Qualification	1965 & 1966 (Combined)	1967	1968	Totals
Not qualified	1	0	1	2
Meets minimum qualification	8	11	5	24
Well qualified	12	13	12	37
No response	2	2	2	6

Degree of Satisfaction

More than 75 percent of the graduates are satisifed or well satisfied with their present job. Table VIII gives a summary of the responses in this regard.

TABLE VIII

DEGREE OF OVERALL SATISFACTION WITH PRESENT JOB BY YEAR AND SEX

Degree of Satisfaction	1965 & 1966 (Combined)		1967		1968		Totals	
	Male	Female	Male	Female	Male	Female	Male	Female
Extremely well satisfied	0	6	0	6	1	3	1	15
Satisfied	1	12	1	13	2	10	4	35
Indifferent	2	0	1	1	0	0	3	1
Dissatisfied	0	0	0	2	0	2	0	4
No Response	0	2	0	2	0	2	0	6

Factors Contributing to Satisfaction on Job

Female employees checked working conditions, salary, and opportunity for advancement as the most frequent factors of satisfaction. A total of 125 favorable responses as against 34 unfavorable responses were elicited from this group. Males, although smaller in number, ranked the items in the same order. Only 7 of 27 responses were in the dissatisfied categories by men employees. A summary by sex and year is presented in Table IX.

TABLE IX

FACTORS CONTRIBUTING TO SATISFACTION OR DISSATISFACTION WITH PRESENT JOB, BY YEAR AND SEX

Factor	1965 & 1966 (Combined)				1967				1968				Totals			
	Male		Female		Male		Female		Male		Female		Male		Female	
	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D
Opportunity for Advancement	1	2	13	3	1	1	11	6	3	0	8	5	5	3	32	12
Working Conditions	3	0	16	2	1	1	19	2	3	0	14	1	7	1	49	5
Salary	3	0	10	8	1	1	15	4	2	1	12	3	6	2	37	15
Others	1	0	3	1	1	1	2	1	0	0	2	0	2	1	7	2
Total	8	2	42	14	4	4	47	13	8	1	36	9	20	7	125	34

S = Satisfied D = Dissatisfied

Plans for Staying on the Job

A high percentage of the employees, 74 percent, indicated they plan to stay in their current position. This is further evidence of their satisfaction. Of the remaining 26 percent, 16 percent indicated they did not plan to remain in their present job and 10 percent were non-committal. A quick resume of those reflecting a desire to change were those seeking higher paying positions within the field or in related fields.

TABLE X

PLANS FOR REMAINING IN THIS TYPE OF WORK
BY YEAR AND SEX

Response	1965 & 1966 (Combined)		1967		1968		Totals	
	Male	Female	Male	Female	Male	Female	Male	Female
Yes	1	16	1	20	3	10	5	46
No	1	2	1	2	0	5	2	9
No Response	1	2	0	2	0	2	1	6

General Information, Employers

Employers were asked to respond concerning present job titles of employed graduates, duties and responsibilities assigned, capability for working in other job titles, degree of qualification for present job title, and means used to advance or promote employees. Job titles held by graduates are discussed as reported by graduates under the previous section General Information, Employed Graduates and presented in Table VI. Specific duties and responsibilities reported by employers were limited in number and are not reported in this report. In response to this same item employed graduates tended to list many more duties and responsibilities than did their employers. Many of the employers did not respond to the questionnaire item concerning employee capability for working in job titles other than the one currently held. Those who responded had a tendency to name other job titles which would carry additional responsibility for the employed graduate.

Employer Rating on Qualification of Employed Graduates

Employers of graduates (immediate supervisors of employed graduates) were asked "How qualified do you feel this graduate is in his present job title?" None of the responding employers rated their employees as "not qualified." A rating of "well qualified in present position" was assigned by 83 percent of the employers and the remaining 17 percent rated their respective employed graduates as "meeting minimum qualification."

TABLE XI

EMPLOYER RATING ON QUALIFICATION OF EMPLOYED GRADUATES IN PRESENT JOB TITLES CLASSES OF 1965-68 INCLUSIVE

Employer Response	Classes of 1965 & 1966 (Combined)	Class of 1967	Class of 1968	Total
Well Qualified	9	12	9	30
Meets Minimum Qualification	2	2	2	6
Not Qualified	0	0	0	0

Employer Means of Providing for Advancement

Employers were asked to indicate by what means they provide for advancement of employees. The majority of employers or 80 percent indicated that advancement takes the form of increased salary and more responsibility. Salary increase alone was reported as the means of advancement by 14 percent of the employers while only 6 percent promoted employees by advancing them to another job title.

TABLE XII

EMPLOYER MEANS OF PROVIDING FOR ADVANCEMENT - EMPLOYED GRADUATES CLASSES OF 1965-68 INCLUSIVE

Means of Providing Advancement	Classes 1965-66 (combined)	Class of 1967	Class of 1968	Total
Salary Increase Only	1	3	1	5
More Responsibility	0	0	0	0
Both More Salary and More Responsibility	9	10	10	29
Promotion to Another Job Title	1	1	0	2
Not Given Advancement	0	0	0	0

Relevance of Training Received at Delhi to the Job

Graduates were asked to evaluate the need for and adequacy of training to the specific job they are now holding. Three degrees of need were identified; (E) Essential - used regularly in the performance of my job; (D) Desirable-makes my job easier to perform; and (U) Unnecessary - not needed on this job.

The scale used to identify the ADEQUACY of the training was (S) Superior - provided outstanding preparation for my job; (A) Adequate - provided necessary preparation for my job; (I) Inadequate - did not prepare me adequately for my job; (NA) Not applicable - no opportunity to secure the training while I was enrolled; (DNA) Does Not Apply - no relevance to my job. Employers were likewise asked to evaluate graduates using the exact same instrument.

The specific knowledge or ability to be measured was assigned to one of five major instructional areas. These were: Area I - General; Area II - Anatomy, Physiology and Histology; Area III - Animal Care and Nutrition; Area IV - Parasitology, Hematology, Pathology and Food Inspection; and Area V - Scientific Instrumentation and Laboratory Equipment. Data from this part of the study will be presented in rank order by knowledge or ability as reflected by employees and employers. Percent of respondents will also be given. Tables will further present Need for Training by employees and employers side by side for comparative purposes. The same will be true for adequacy of Training.

Area I - General

This category included the general knowledges and abilities expected of technical workers plus specific abilities not covered in the remaining four areas. The human relations aspect of communication, working with people, accepting responsbility, are typical concerns of employers and employees alike.

Need for Training

Table XIII presents a summary by rank order of items deemed essential by employees and employers.

TABLE XIII

RANK ORDER OF KNOWLEDGES AND ABILITIES, NEEDED AND DEEMED ESSENTIAL BY EMPLOYEES AND EMPLOYERS, CLASSES OF 1965 TO 1968, INCLUSIVE, AREA I - GENERAL

Employees N = 69			Employers N = 36			
Rank	No.	%	Rank	No.	%	Knowledge or Ability
1	60	(87)	1	33	(92)	Ability to accept and carry out responsibility.
2	55	(80)	2	32	(89)	Ability to follow directions.
3	52	(75)	4	27	(75)	Ability to get along with people.
4	51	(73)	7	20	(56)	Ability to assume initiative when necessary.
5	45	(65)	3	28	(78)	Ability to keep adequate records.
6	44	(63)	5	25	(69)	Ability to "grow" on the job.
7	39	(56)	14	10	(28)	Ability to interpret technical language.
8	38	(54)	6	21	(58)	Ability to communicate in oral expression.
9	33	(48)	10	15	(41)	Knowledge of laws regarding humane treatment of animals.
10	26	(38)	12	14	(39)	Ability to supervise other less skilled employees.
11	25	(36)	8	17	(47)	Knowledge of the ethical practices involved in animal technology.
12	24	(34)	9	16	(44)	Ability to handle routine mathematical problems.
13	21	(30)	20	2	(6)	Knowledge of our form of government and role of governmental regulations.
13	21	(30)	13	13	(36)	Ability to serve as a general receptionist.
15	20	(29)	11	15	(41)	Ability to communicate in written language.

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
16	17	(25)	16	5	(14)	Ability to use technical journals and other library resources.
17	15	(22)	17	5	(14)	Ability to write a technical report.
18	7	(10)	18	5	(14)	Ability to present a demonstration.
19	6	(8)	15	7	(19)	Knowledge of how our economic system operates.
20	4	(6)	19	4	(11)	Ability to prepare and deliver a speech.

Of the total of twenty Knowledges or Abilities listed, eight were identified by a majority of employees as essential in the conduct of their job. Employers were nearly in agreement with seven receiving majority votes, however, they did not specify "Ability to interpret technical language" as one of the essential items as did employees. The abilities to accept and carry out responsibility, follow directions, get along with people, keep adequate records, grow on the job, and assume initiative when necessary were common elements identified by both groups. At the bottom of the list by employees was the ability to deliver a speech, while employers ranked knowledge of our form of government and role of governmental regulations last.

Adequacy of Training

Training was rated as adequate* in 15 of the 20 Knowledge or Abilities by employees. The five not rated adequate were in those areas rated lowest in terms of Need; Knowledge of economic system, Ability to deliver a speech or give a demonstration, Ability to serve as a receptionist, and Ability to supervise other less skilled employees. Employers were almost in total agreement with employees and in general rated adequacy of training higher on most items.

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* Includes all employees and employers who rated training received as Superior or Adequate.

TABLE XIV

RANK ORDER OF KNOWLEDGES AND ABILITIES BASED ON ADEQUACY OF TRAINING BY EMPLOYEES AND EMPLOYERS, CLASSES OF 1965 TO 1968, INCLUSIVE, AREA I - GENERAL

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
1	56	(80)	1	34	(94)	Ability to follow directions.
2	55	(78)	9	29	(81)	Knowledge of the ethical practices involved in animal technology.
3	53	(77)	1	34	(94)	Ability to accept and carry out responsibility.
3	53	(77)	7	30	(83)	Knowledge of laws regarding humane treatment of animals.
5	52	(75)	1	34	(94)	Ability to keep adequate records.
6	50	(71)	9	29	(81)	Ability to communicate in written language.
7	49	(70)	4	33	(92)	Ability to get along with people.
8	48	(68)	11	28	(78)	Ability to interpret technical language.
9	47	(66)	12	27	(75)	Ability to handle routine mathematical problems.
10	45	(64)	14	22	(61)	Ability to use technical journals and other library resources.
11	44	(62)	6	31	(86)	Ability to communicate in oral expression.
12	43	(60)	7	30	(83)	Ability to assume initiative when necessary.

TABLE XIV (continued)

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
12	43	(60)	4	33	(92)	Ability to "grow" on the job.
14	37	(56)	17	16	(44)	Knowledge of our form of government and role of governmental regulations.
15	36	(54)	18	12	(33)	Ability to write a technical report.
16	29	(41)	19	11	(31)	Ability to present a demonstration.
17	27	(39)	16	17	(47)	Knowledge of how our economic system operates.
18	26	(37)	13	24	(67)	Ability to supervise other less skilled employees.
18	26	(37)	20	9	(25)	Ability to prepare and deliver a speech.
20	25	(35)	15	20	(56)	Ability to serve as general receptionist.

Area II encompassed the subject matter related to anatomy, physiology and histology.

Need for Training

Of the 17 items listed, a majority of employees listed only three as being essential to the job now held. These three were: (1) Knowledge of the definitions, descriptive terms, and other language of the field; (2) Knowledge of microscopic and gross anatomy; and (3) Knowledge of the applications of anatomy and physiology. Employers did not rate any single item as being essential. Rank orders of the two groups closely paralleled, however, a great difference in percent existed. For example, No. 1 on both lists was the knowledge of definitions, etc. with

77 percent of employees rating it essential, but only 39 percent of employers. Perhaps the working of the three items mentioned above were all inclusive, but the fact remains, employers still did not rate them essential in a majority of cases. Many employers did rate the items as desirable (see appendix B-1).

TABLE XV

RANK ORDER OF KNOWLEDGES AND ABILITIES, NEEDED AND DEEMED ESSENTIAL BY EMPLOYEES AND EMPLOYERS, CLASSES OF 1965 TO 1968, INCLUSIVE, AREA II - ANATOMY, PHYSIOLOGY AND HISTOLOGY

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
1	46	(79)	1	14	(39)	Knowledge of the definitions, descriptive terms, and other language of the field.
2	39	(57)	3	8	(22)	Knowledge of microscopic and gross anatomy.
3	35	(53)	3	8	(22)	Knowledge of the applications of anatomy and physiology.
4	31	(45)	3	8	(22)	Knowledge of the physiology of the circulatory system.
5	28	(39)	2	9	(25)	Knowledge of the anatomy of the circulatory system.
6	22	(32)	7	6	(17)	Knowledge of the anatomy of the muscular system.
7	20	(28)	7	6	(17)	Knowledge of the anatomy of the respiratory system.
8	19	(27)	7	6	(17)	Knowledge of the anatomy of the digestive system.
9	18	(26)	7	6	(17)	Knowledge of the anatomy of the urogenital system.

TABLE XV (continued)

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
10	17	(24)	13	5	(14)	Knowledge of the physiology of the urogenital system.
10	17	(24)	7	6	(17)	Knowledge of the physiology of the respiratory system.
10	17	(24)	6	7	(19)	Knowledge of the anatomy of the nervous system.
13	16	(22)	7	6	(17)	Knowledge of the physiology of the digestive system.
13	16	(22)	13	5	(14)	Knowledge of the physiology of the nervous system.
14	15	(21)	13	5	(14)	Knowledge of the physiology of the muscular system.
14	15	(21)	17	4	(11)	Knowledge of the anatomy of the endocrine system.
14	15	(21)	13	5	(14)	Knowledge of the physiology of the endocrine system.

Adequacy of Training

Employees rated their training as adequate in all of the items specified, ranging from a high of 82 percent to a low of 64 percent. Employers agreed that the training was adequate or better in every case, with a high of 78 percent and a low of 53 percent.

TABLE XVI

RANK ORDER OF KNOWLEDGES AND ABILITIES BASED ON ADEQUACY OF TRAINING BY EMPLOYEES AND EMPLOYERS, CLASSES OF 1965 TO 1968, INCLUSIVE, AREA II - ANATOMY, PHYSIOLOGY AND HISTOLOGY

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
1	56	(80)	1	28	(78)	Knowledge of the definitions, descriptive terms, and other language of the field.
2	55	(82)	3	24	(67)	Knowledge of the anatomy of the respiratory system.
2	55	(82)	3	24	(67)	Knowledge of the anatomy of the digestive system.
4	54	(80)	7	22	(61)	Knowledge of the anatomy of the muscular system.
4	54	(80)				Knowledge of the anatomy of the circulatory system.
6	52	(76)	13	20	(56)	Knowledge of the physiology of the circulatory system.
6	52	(76)	7	22	(61)	Knowledge of the anatomy of the urogenital system.
6	52	(76)	8	21	(58)	Knowledge of the physiology of the digestive system.
6	52	(76)	13	20	(56)	Knowledge of the physiology of the muscular system.
10	51	(73)	2	25	(69)	Knowledge of the microscopic and gross anatomy.
11	50	(72)	8	21	(58)	Knowledge of the applications of anatomy and physiology.
11	50	(72)	8	21	(58)	Knowledge of the physiology of the respiratory system.
13	48	(69)	5	23	(64)	Knowledge of the anatomy of the nervous system.

TABLE XVI (continued)

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
13	48	(69)	13	20	(56)	Knowledge of the Anatomy of the endocrine system.
15	47	(67)	17	19	(53)	Knowledge of the physiology of the nervous system.
16	45	(64)	8	21	(58)	Knowledge of the physiology of the urogenital system.
17	43	(62)	13	20	(56)	Knowledge of the physiology of the endocrine system.

Area III - Animal Care and Nutrition

Need for Training

Only six of 25 items were listed as essential by employees with ranges from 66 to 50 percent respondents so agreeing. Employers classified five of these same items as being essential. The general areas of care, feeding, disposal, sanitation, and management of animals plus basic nutritional information was not included in either group. General knowledge relating to livestock (farm) such as TDN, vitamins, and minerals was not deemed essential by employees or employers.

TABLE XVII

RANK ORDER OF KNOWLEDGES AND ABILITIES, NEEDED AND DEEMED ESSENTIAL BY EMPLOYEES AND EMPLOYERS, CLASSES OF 1965 TO 1968, INCLUSIVE, AREA III - ANIMAL CARE AND NUTRITION

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
1	46	(66)	4	21	(58)	To be able to apply methods of restraint to animals.
2	45	(64)	3	22	(61)	To be able to identify symptoms of ill health.
3	43	(62)	1	23	(64)	To know the factors involved in humane treatment of animals.
4	41	(59)	5	20	(56)	To know and understand the reasons for euthanasia in animals.
5	39	(57)	1	23	(64)	To be able to administer or assist in administering anesthesia to animals.
6	34	(50)	7	16	(44)	To be able to collect specimens of blood.
7	33	(48)	7	16	(44)	To be able to care for, including caging, bedding, and feeding of animals.
8	32	(46)	12	7	(19)	Knowledge of other domesticated animals, including laboratory animals.
9	31	(45)	6	19	(53)	To be able to apply an adequate sanitation program to various animals.
10	28	(39)	10	9	(25)	To know proper autopsy and disposal methods.
11	19	(27)	10	9	(25)	To understand the legal requirements regarding animals used in research.
12	18	(25)	9	15	(41)	To understand the general principles of nutrition.
13	13	(20)	14	3	(8)	To understand the process of digestion and absorption of feed by animals.

TABLE XVII (Continued)

Employees N = 69			Employers N = 39			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
13	13	(20)	12	7	(19)	To understand the nutritive needs of animals of different classes.
15	9	(13)	21	1	(3)	To be able to organize a breeding program for laboratory animals.
15	9	(13)	14	3	(8)	To know the mineral needs of animals.
15	9	(13)	14	3	(8)	To know the vitamin needs of animals.
18	8	(12)	20	2	(6)	Knowledge of general livestock production.
18	8	(12)	14	3	(8)	To understand the principles of heredity.
18	8	(12)	19	2	(6)	A knowledge of the problems caused by heredity variation.
21	6	(8)	22	0	(0)	To be able to interpret feed analysis reports.
22	4	(6)	14	3	(8)	Knowledge of specific livestock classes - dairy cattle, swine, sheep, horses and poultry.
23	4	(6)	20	2	(6)	To understand and care for gnotobiote animals.
24	3	(4)	22	0	(0)	To be able to figure TDN, nutritive ratio, and net energy of feeds.
24	3	(4)	14	3	(8)	To know how to handle and care for axenic animals.

Adequacy of Training

Employees generally rated their adequacy of training higher than did employers. All of the items deemed essential by employees were adequately covered, based on a majority of respondents. Eighteen of the 25 items were identified as being adequately covered by employees with 12 so identified by employers. A very large number of employers reported that many items did not apply (DNA) on the job now held.

TABLE XVIII

RANK ORDER OF KNOWLEDGES AND ABILITIES BASED ON ADEQUACY OF TRAINING BY EMPLOYEES AND EMPLOYERS, CLASSES OF 1965 TO 1968, INCLUSIVE, AREA III - ANIMAL CARE AND NUTRITION

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
1	51	(73)	1	34	(94)	To know the factors involved in humane treatment of animals.
1	51	(73)	3	29	(81)	To be able to identify symptoms of ill health.
3	49	(70)	2	31	(86)	To know and understand the reasons for euthanasia in animals.
4	48	(69)	10	24	(67)	Knowledge of other domesticated animals including laboratory animals.
4	48	(69)	8	25	(69)	To be able to apply an adequate sanitation program to various animals.
4	48	(69)	11	23	(64)	To know proper autopsy and disposal methods.
4	48	(69)	5	27	(75)	To understand the general principles of nutrition.
8	47	(67)	7	26	(72)	To be able to care for, including caging, bedding, and feeding of animals.
9	45	(63)	5	27	(75)	To be able to administer or assist in administering anesthesia to animals.
9	45	(63)	20	10	(28)	To know the vitamin needs of animals.
11	44	(61)	22	6	(17)	To know the mineral needs of animals.
12	42	(60)	8	25	(69)	To be able to collect specimens of blood.
12	42	(60)	16	13	(36)	Knowledge of general livestock production.
14	41	(58)	16	13	(36)	Understand the process of digestion and absorption of feed by animals.

TABLE XVIII (Continued)

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
14	41	(58)	14	14	(39)	To understand the nutritive needs of animals of different classes.
16	39	(56)	4	28	(78)	To be able to apply methods of restraint to animals.
17	37	(53)	12	21	(58)	To understand the legal requirements regarding animals used in research.
17	37	(53)	19	11	(31)	Knowledge of specific livestock classes of dairy cattle, swine, sheep, horses and poultry.
19	34	(49)	13	15	(41)	To understand the principles of heredity.
20	31	(45)	14	14	(39)	A knowledge of the problems caused by heredity variation.
20	31	(45)	21	7	(19)	To know how to handle and care for axenic animals.
22	29	(41)	22	6	(17)	To be able to organize a breeding program for laboratory animals.
23	28	(39)	22	6	(17)	To understand and care for gnotobiote animals.
24	25	(36)	16	13	(36)	To be able to figure TDN, nutritive ratio, and net energy of feeds.
25	18	(26)	25	5	(14)	To be able to interpret feed analysis reports.
26	9	(13)				To understand how different classes of animals utilize various feeds.

Area IV - Parasitology, Hematology, Pathology and Food Inspection

Need for Training

Of the fifteen knowledges and abilities listed, employees designated four as being essential to the job now held. Percent so responding ranged from 54 to 52. Basic knowledge in these areas was considered critical. Employees rated two of the same items as essential with the other two next in rank order. Percent of employees responding to given items was very close to that of employees indicating high agreement on the specific knowledges and abilities needed by workers. A majority of employees and employers rated most items as being desirable training, with the exception of those related to public health or food inspection.

TABLE XIX

RANK ORDER OF KNOWLEDGES AND ABILITIES, NEEDED AND DEEMED ESSENTIAL BY EMPLOYEES AND EMPLOYERS, CLASSES OF 1965 TO 1968, INCLUSIVE, AREA IV - PARASITOLOGY, HEMATOLOGY, PATHOLOGY AND FOOD INSPECTION

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
1	37	(54)	3	17	(47)	Knowledge of disease transmission.
1	37	(54)	4	13	(36)	Ability to identify internal and external parasites in animals.
1	37	(54)	6	11	(31)	Knowledge of the life cycles of common animal parasites.
4	36	(52)	1	21	(58)	To be able to perform basic hematological procedures.
5	33	(49)	2	20	(56)	Knowledge of the diseases of animals that are hazardous to human health.
6	25	(36)	6	11	(31)	Ability to understand methods, procedures and records used in animal research.
7	15	(22)	9	8	(22)	Ability to use microscopic plate methods for bacterial analysis.
8	14	(20)	5	12	(33)	Understand the nature of micro-organisms as they relate to human endeavor.
9	13	(18)	10	7	(19)	Knowledge of basic principles involved in classifying and identifying the common micro-organisms.
10	11	(16)	8	9	(25)	Ability to prepare animal tissue for examination.
11	8	(11)	12	4	(11)	Ability to examine animal cell structure.
12	6	(9)	14	3	(8)	Understand the relationship of inspection to public health.

TABLE XIX (continued)

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
13	4	(6)	15	2	(6)	Understand the principles of food plant sanitation.
14	3	(4)	12	3	(8)	Ability to interpret and use farm and plant inspection reports.
14	3	(4)	10	7	(19)	Knowledge of food inspection enforcement procedures.

Adequacy of Training

Adequacy of training was generally reported at a high level by both employees and employers, ranging from a top of 84 to a low of 33. Of the items deemed essential, the highest percentage reporting training as adequate was 84 and the lowest was 18 percent. Table XX gives a complete summary of responses.

TABLE XX

RANK ORDER OF KNOWLEDGES AND ABILITIES BASED ON ADEQUACY OF TRAINING BY EMPLOYEES AND EMPLOYERS, CLASSES OF 1965 TO 1968, INCLUSIVE, AREA IV - PARASITOLOGY, HEMATOLOGY, PATHOLOGY AND FOOD INSPECTION

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
1	58	(84)	1	30	(83)	Knowledge of disease transmission.
2	53	(77)	4	25	(69)	Knowledge of diseases of animals that are hazardous to human health.
2	53	(77)	3	27	(75)	Knowledge of life cycles of common animal parasites.
4	51	(74)	5	24	(67)	Ability to identify internal and external parasites in animals.
5	48	(70)	2	28	(78)	Understand the nature of microorganisms as they relate to human endeavor.
6	47	(68)	5	24	(67)	To be able to perform basic hematological procedures.
7	44	(63)	9	19	(53)	Knowledge of basic principles involved in classifying and identifying various types of blood cells.
8	41	(59)	10	14	(39)	Ability to prepare animal tissue for examination.
9	38	(54)	7	21	(58)	Ability to use microscopic plate methods for bacterial analysis.
10	36	(52)	12	10	(28)	Ability to examine animal cell structure.
11	34	(50)	8	20	(56)	Ability to understand methods, procedures and records used in animal research.
12	27	(39)	11	12	(33)	Understand the relationship of inspection to public health.
13	26	(37)	12	10	(28)	Understand the principles of food plant sanitation.
14	16	(23)	14	8	(22)	Ability to interpret and use farm and plant inspection reports.
15	7	(10)	15	7	(20)	Knowledge of food inspection enforcement procedures.

Area V - Scientific Instrumentation and Laboratory Equipment

Need for Training

Only two of the 31 items were deemed essential by more than 50 percent of the employees. Employers identified these same two plus three others as being essential. Both groups listed an additional five items as essential in one-third or more of the positions currently being held by employees.

Major items listed were abilities to use pre-surgical equipment, autoclave, blood cell counters, balances, centrifuges, and X-ray equipment. Nearly all employers and employees listed most items as being desirable (See Appendix B-1).

TABLE XXI

RANK ORDER OF KNOWLEDGES AND ABILITIES, NEEDED AND DEEMED ESSENTIAL BY EMPLOYEES AND EMPLOYERS, CLASSES OF 1965 TO 1968, INCLUSIVE, AREA V - SCIENTIFIC INSTRUMENTATION AND LABORATORY EQUIPMENT

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
1	36	(52)	1	23	(64)	Know how to operate an autoclave.
2	34	(50)	2	21	(58)	Ability to use pre-surgical preparation equipment.
3	29	(33)	3	20	(58)	Ability to operate electric sterilizer.
4	28	(31)	4	19	(53)	Ability to use blood cell counting chambers and equipment.
5	24	(35)	6	17	(47)	Ability to use hematocrit centrifuges.
5	24	(35)	7	15	(41)	Understand how to develop the X-ray negative.
7	23	(33)	5	18	(50)	Ability to use oxygen equipment for emergency purposes.
7	23	(33)	8	12	(33)	Ability to use Mettler analytical balance.
9	21	(30)	12	8	(22)	Ability to use Spencer hemoglobinometer.
10	17	(26)	21	3	(8)	Ability to use pH meters.
11	13	(20)	12	8	(22)	Knowledge of ethaire anesthetic machine.
12	15	(22)	8	12	(33)	Understand and operate X-ray equipment, including taking a roentgenogram.
13	12	(18)	11	10	(28)	Knowledge of multiple inhalant anesthetic machine.
14	11	(16)	12	8	(22)	Ability to use "Spectronic 20" Photocolorimeter.

TABLE XXI (Continued)

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
15	9	(13)	20	4	(11)	Understand principles and operation of Coulter particle counter.
16	8	(12)	12	8	(22)	Ability to operate an animal incinerator.
17	7	(10)	17	5	(14)	Understand principles and operation of lyophylizing apparatus.
18	6	(8)	8	12	(33)	Know complete operation and cycles of autotechnicon.
19	5	(7)	26	1	(3)	Understand principles and operation of paper chromatographs.
20	4	(6)	23	2	(6)	Know the principles and uses of Axenic equipment and techniques.
20	4	(6)	16	7	(19)	Ability to operate a modern cage washing machine.
22	3	(4)	21	3	(8)	Ability to understand and use pulmonary function equipment.
22	3	(4)	23	2	(6)	Understand principles and operation of Flame photometer.
22	3	(4)	23	2	(6)	Understand principles and operation of ion exchange equipment.
25	2	(3)	17	5	(14)	Knowledge of electro-anesthesia equipment.
25	2	(3)	17	5	(14)	Understand operation of microtome and accessory equipment.
25	2	(3)	26	1	(3)	Understand principles and operation of gas chromatographs.
25	2	(3)	26	1	(3)	Understand principles and operation of F. A. scopes.
25	2	(3)	26	1	(3)	Understand principles and operation of electrophoresis equipment.

TABLE XXII

RANK ORDER OF KNOWLEDGES AND ABILITIES BASED ON ADEQUACY OF TRAINING BY EMPLOYEES AND EMPLOYERS, CLASSES OF 1965 TO 1968, INCLUSIVE, AREA V - SCIENTIFIC INSTRUMENTATION AND LABORATORY EQUIPMENT

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
1	45	(65)	1	29	(81)	Know how to operate an autoclave.
1	45	(65)	4	23	(64)	Ability to use hematocrit centrifuges.
3	43	(62)	3	24	(67)	Ability to use blood cell counting chambers and equipment.
4	41	(60)	1	29	(81)	Ability to use pre-surgical preparation equipment.
5	40	(59)	12	12	(33)	Ability to use the Spencer hemoglobinometer.
6	35	(50)	9	13	(36)	Ability to use the Mettler analytical balance.
6	35	(50)	7	19	(53)	Understand how to develop the X-ray negative.
8	32	(46)	9	13	(36)	Knowledge of ethaire anesthetic machine.
9	30	(43)	6	21	(58)	Ability to operate electric sterilizer.
10	28	(40)	15	9	(25)	Ability to use pH meters.
10	28	(40)	31	3	(8)	Know the principles and uses of Axenic equipment and techniques.
12	25	(36)	19	6	(17)	Knowledge of multiple inhalant anesthetic machine.
12	25	(36)	8	16	(44)	Understand and operate X-ray equipment, including taking a roentgenogram.
14	22	(32)	12	12	(33)	Ability to use "Spectonic 20" photocolorimeter.

TABLE XXII (continued)

Employees N = 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
14	22	(32)	14	11	(31)	Know complete operation and cycles of autotechnicon.
14	22	(32)	4	23	(64)	Ability to use oxygen equipment for emergency purposes.
14	22	(32)	19	6	(17)	Knowledge of electro-anesthesia equipment.
18	15	(21)	16	8	(22)	Ability to operate a modern cage washing machine.
19	11	(15)	25	5	(14)	Understand principles and operation of F.A. scopes.
20	10	(14)	17	7	(19)	Understand principles and operation of Coulter particle counter.
20	10	(14)	19	6	(17)	Understand principles and operation of lyophylizing apparatus.
20	10	(14)	19	6	(17)	Understand principles and operation of paper chromatographs.
23	9	(12)	17	7	(19)	Understand operation of microtome and accessory equipment.
23	9	(12)	27	4	(11)	Understand principles and operation of gas chromatographs.
25	8	(11)	19	6	(17)	Ability to understand and use pulmonary function equipment.
26	7	(10)	27	4	(11)	Ability to understand physiological principles as demonstrated by use of a physiograph machine.
26	7	(10)	19	6	(17)	Understand principles and operation of infrared spectrophotometer.
28	6	(8)	9	13	(36)	Ability to operate an animal incinerator.
29	5	(7)	27	4	(11)	Understand principles and operation of the Flame photometer.

TABLE XXII (continued)

Employees N - 69			Employers N = 36			Knowledge or Ability
Rank	No.	%	Rank	No.	%	
30	4	(6)	25	5	(14)	Understand principles and operation of ion exchange equipment.
31	3	(4)	27	4	(11)	Understand principles and operation of electrophoresis equipment.

General Information, Graduates Pursuing Further Education

Information concerning number of credit hours transferred, time of decision to pursue further education, type of institution and type of degree being pursued is presented in Tables XXIII through XXIX.

Credits transferred from Delhi to other educational institutions ranged from "less than 20" to the "90 to 99" category. However, the range most frequently reported was 50 to 69 semester credit hours transferred.

A decision to continue formal education beyond Delhi was reported by 51 percent of the responding students as having been made prior to enrolling at Delhi. This decision was reported by 43 percent as having been made while attending Delhi.

Students pursuing further education report that they are attending four year institutions. All respondents were enrolled in such institutions.

The B. S. is the degree most frequently pursued as reported by graduates pursuing further education. Table XXX indicates that 68 percent of the graduates pursuing further education are candidates for the B.S. degree.

Of the 37 graduates pursuing further education who responded to the questionnaire only 8 or 22 percent are female.

TABLE XXIII

NUMBER OF SEMESTER CREDIT HOURS TRANSFERRED FROM DELHI TO PRESENT EDUCATIONAL INSTITUTION BY GRADUATES PURSUING FURTHER EDUCATION

Semester Hours	1965 to 1966 (combined) N=12	1967 N=13	1968 N=12	Total
Less than 20	1			1
20 to 29	2	2		4
30 to 39	2	2	4	8
40 to 49	2		1	3
50 to 59	1	2	4	7
60 to 69	1	5	1	7
70 to 79		1		1
80 to 89	1			1
90 to 99	1			1
No response	1	1	2	4

TABLE XXIX

TIME OF DECISION TO CONTINUE FORMAL EDUCATION BEYOND THAT RECEIVED AT DELHI FOR GRADUATES PURSUING FURTHER EDUCATION

Time of Decision	1965 and 1966 (combined) N=12	1967 N =13	1968 N=12	Total
Prior to enrolling at Delhi	5	7	7	19
While attending Delhi	5	6	5	16
After graduating from Delhi	1			1
No response	1			1

TABLE XXX

TYPE OF INSTITUTION IN WHICH GRADUATES PURSUING EDUCATION ARE ENROLLED

N = 37

Type of Institution	1965 and 1966 (combined) N=12	1967 N=13	1968 N=12	Total
Two Year				
Four Year	11	13	11	35
No Response	1		1	2

TABLE XXXI

TYPES OF DEGREES FOR WHICH STUDENTS PURSUING FURTHER EDUCATION ARE CANDIDATES

N = 35

Degree	1965 and 1966 (combined) N=12	1967 N=13	1968 N=12	Total
B. S.	5	10	10	25
B.S.A.	3			3
B. A.	2		1	3
A. B.		1		1
B.B.A.		1		1
Other		1		1
None	2		1	3

SUMMARY OF FINDINGS AND RECOMMENDATIONS

SUMMARY OF FINDINGS

The following summary of the findings are based upon the results of the follow-up study of graduates and employers.

Graduates Employed and Employers

1. Sixty-five percent of the graduating students accepted employment and the remaining thirty-five percent elected to continue their education by transferring to a four-year college.

2. Girls comprised eighty-seven percent of the employees while boys comprised seventy-eight percent of those continuing their education.

3. Four out of every five graduates were employed in jobs which utilize their training received at Delhi.

4. Thirty percent of those employed showed their job title to be veterinary assistant. Over twenty percent were employed as animal laboratory assistants, seventeen percent as biomedical technician and seventeen percent as other technicians.

5. Only two of sixty-three employees indicated they were not qualified to hold the job in which they were now employed and only four of sixty-five employees were dissatisfied with their present job.

6. Fifty-one or eighty-five percent of employees planned to remain on the job.

7. Eight abilities in Area I - General were identified as essential by a majority of employees. Employers designated

seven of these same items as being essential. A majority of the remaining items were deemed desirable by both groups.

8. Adequacy of training in Area I - General was rated as satisfactory by a majority of employees and employers in fifteen of the twenty items. Very close agreement was expressed by both groups with employers generally rating adequacy of training higher than graduates.

9. The need for training in Area II - Anatomy, Physiology, and Histology was identified as essential by employees for only three items relating to general knowledge in the field. However, of the remaining fourteen items, eleven were listed as desirable. Employers did not rank a single item as essential, but eleven of the seventeen were deemed desirable. Adequacy of training was very high according to both groups with the lowest item receiving more than fifty percent of the votes.

10. Employees designated six of twenty-five items in Area III as essential to the job now held and employers concurred in five of the six. Both groups were somewhat less inclined to agree with the adequacy of training, however, eighteen items received a majority of votes by both groups on adequacy. A number of employees reported that the items did not apply (DNA) on the job now held. Items relating to general livestock nutrition and care were not considered essential by either employees or employers.

11. In Area IV - Parasitology, Hematology, Pathology and Food Inspection, employees designated four knowledges and abilities as essential. Employers concurred in two of the

four items. Most other items were rated desirable by both groups. Adequacy of training was described at a high level by both employees and employers, but again a significant percentage classified some items as not applicable.

12. In the last Area - Scientific Instrumentation and Laboratory Equipment, only two knowledges or abilities were marked as essential by employees. These same two, plus three others were identified by employers as essential. However, both employees and employers stated that a majority of the items were desirable. Adequacy of training was reflected as generally low with a large number of each group again marking the items as not applicable on the job now held.

13. Employees generally reflected favorably upon the skills and abilities gained in the five areas, even when such items were not considered essential for the job. The total number of abilities listed as being inadequately covered in the training program, based on total responses, was less than three percent.

14. Employers generally rated training as adequate even when such abilities or knowledges were not used on the job. A large number of responses from employers, almost one-third, reported items were not applicable to the job now performed.

15. Employers, with some exceptions, were apparently not making full use of the knowledge and abilities held by employees who graduated from the Delhi Animal Science curriculum. Whether deterred by legal restrictions, personal choice, or lack of knowledge of capabilities held by these

technical employees, it seemed, nevertheless, to hold true in most cases.

16. Although some jobs may require considerable amounts of repetitive or lower level abilities, it seems possible that additional responsibilities given to technical employees, who have had the training, would be an improved usage of this trained manpower, with concomitant advantages to both employees and employers.

Employers

1. Employers of graduates considered them qualified for their present jobs with eighty-three percent rating their employed graduates "well qualified" and the remaining seventeen percent rating "qualified."

2. Advancement or promotion of employed graduates takes place in the form of increased salary along with more responsibility. The majority of employers, or eighty percent of those reporting, promoted employees in this way.

Graduates Pursuing Further Education

1. Male graduates have a greater tendency than female graduates to pursue further education. Of the thirty-seven graduates engaged in further education who responded, seventy-eight percent were male and twenty-two percent female.

2. The animal technology program has an influence on the decision of students to continue formal education beyond Delhi. Among the responding students engaged in further education, fifty-one percent made their decision to do so prior to enrolling at Delhi and forty-three percent

made their decision while at Delhi.

3. Graduates who pursue further education do so in four-year institutions. All graduates pursuing further education were enrolled in such institutions.

4. A majority of graduates pursuing further education are candidates for the B. S. degree. Of those reporting sixty-eight percent sought this degree.

5. There is considerable variability in the amount of credit transferred by students who pursue further education. The number of transfer credits ranged from the "less than twenty" category to the 90 to 99" category among students reporting.

6. Graduates pursuing further education considered their training at Delhi relevant in relation to their present educational objective. More than half of the knowledges and abilities in content Areas I, II, III and IV were rated adequate or superior by fifty percent or more of the students pursuing further education.

7. Graduates pursuing further education varied to a greater degree in their rating of Area V - Scientific Instrumentation and Laboratory Equipment than in their ratings of other content areas. Half of the knowledges and abilities in this area received adequate or superior ratings by less than fifty percent of the respondents.

RECOMMENDATIONS

The recommendations in this report are based on the findings of the follow-up study as well as the personal and professional contacts over a period of more than five years with staff, students, and employers.

1. That the program at State University Agricultural and Technical College at Delhi, in the training of animal science technicians, be continued with adequate State support for staff, facilities, and equipment.

2. That the professional staff in the Animal Science Department be actively engaged in the process of selecting incoming students.

3. That occupational goal (technical level training as specialist) be a primary criterion in selection of students. This does not preclude any minimum scholastic scores or other measures used in the selection process.

4. That a strong advisory committee of representative employers of graduates be convened annually to make recommendations regarding the program.

5. That a critical analysis of currently required courses in the curriculum be evaluated against the findings of the essential and desirable skills and abilities identified by employees and employers, 1965-1968.

6. That the possibility of re-aligning course content in selected areas be studied to hopefully minimize the total course offerings with the purpose in mind of reducing the teaching load of all instructors.

7. That adequate technical level assistance be provided teaching staff in organizing for and teaching laboratory sessions, including the possibility of B.S. or A.B. level teaching assistants or instructors.

8. That the position of Laboratory Animal Technician and Veterinary Assistant be formally licensed by the State.

9. That legal restrictions, if any, be clarified or reduced to enable technical assistants in this field to carry out the para-professional activities for which they are trained.

10. That representatives of professional organizations and associations be regularly invited to the campus to provide seminars for prospective employees in these fields. (Not all in one year, but at least one per semester. Example: Veterinary Medical Society of New York, Animal Shelter Society, and others.)

11. That adequate up-to-date brochures be prepared which provide information on the program including admission requirements, curriculum content, kinds of jobs graduates train for, and other pertinent data for use of high school guidance counselors, college admissions staff, and professional associations in the field.

12. That an annual follow-up of graduates be made to determine trends in employment, changes in abilities and knowledge used, and other pertinent data. Schedules A, B and A-1, with regular up-dating, may be satisfactory for this purpose.

13. That as the demand by students and employers increases in this field, careful consideration be given to expanding the program at State University Agricultural and Technical College at Delhi before duplicating the expensive equipment, laboratories and professional staff elsewhere in the State University of New York system. A study of time use of existing facilities and equipment should be the first step in this evaluation.

14. That counseling procedures be established which will attempt to determine as early as possible in each student's Delhi experience whether or not he or she will pursue further education after Delhi.

15. That task analysis be carried out for those occupations most frequently obtained by graduates. This would be done for the purpose of obtaining curricular information based on specific job demands.

16. That prior to graduation all students be oriented to follow-up procedures in order that evaluative follow-up will become a regular post-graduate activity with all graduates conditioned to respond.

17. That as the number of employed graduates increases, consideration be given to in-service or continuing education and training. The purposes of such training would be to keep employees abreast of new developments in animal technology and provide for up-grading in their jobs, and that the support and cooperation of employers be considered in such post-graduate training efforts.

18. That the Delhi staff consider providing leadership for the formation of an Association of Animal Technologists. Such a move might add much to the general welfare and dignity of animal technologists and could influence licensing standards and procedures.

APPENDICES (The following exhibits can be seen in Chapter VIII)

A-1	Schedule Form A
A-2	Schedule Form B
A-3	Schedule Form A-1
A-4	Employees Summary (Job Title, Duties and Responsibilities)
B-1	Grand Totals, Schedule Form A, Classes 1965-68 (N=69)
B-2	Grand Totals, Schedule Form B, Classes 1965-68 (N=36)
B-3	Grand Totals, Schedule Form A-1, Classes 1965-68 (N=37)

CHAPTER VII

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

I. Summary, Conclusions and Implications

During the past twenty five years, since the end of World War II, extensive and diversified growth in the biomedical research and veterinary medical fields has resulted in an ever expanding need for career trained, paraprofessional personnel. Individuals qualified to support and compliment the efforts of the research investigator and to assist the practicing veterinarian in providing more effective service and care of companion (pet) animals and domestic, large animal species were in demand throughout the nation.

Until a decade ago, formal training programs at the college and university level designed to qualify personnel for entry into the animal technician employment field were virtually non existant. Proficiencies concomitant with this occupational area were usually gained as a result of on the job training exercises completed in the research laboratory or at the veterinary hospital.

In 1961, administrative personnel at Delhi College, astutely observed that formal training opportunities for individuals in this expanding career area were in a "long overdue" status. Response to this need resulted in the initiation of perhaps the first, two year Animal Science Technology, AAS Degree program, in the nation.

Delhi College, a unit of the State University of New

York, is one of this state's pioneers in two year higher education. It was at this institution, which fosters the belief that one of the most important requirements for higher education is the sustained, personal and inspiring relationship between student and teacher, that the Animal Science curriculum was started in 1961.

From a beginning class of eight students, this program, which was designed to provide training in a "cluster" of occupational areas proximal to the animal science field increased to 49 participants by 1964. Although the program had grown in *size*, curriculum changes which would have replaced *agricultural-oriented courses* which constituted a major part of the initial course structure, with *animal science specialty courses*, were not possible due to the inavailability of staff, facilities and other resources.

In 1965, as the result of a four and one half year contract award from the United States Office of Education, fiscal support needed for staffing, equipment, supplies and other ancillary provisions became available for development of the scope, size and curricular quality of the program. As shown in (Table I, Page 27) a total of $139,200 was budgeted for this purpose between 1965 and the end of 1969. Simultaneously, support from New York State, primarily for personnel, improved instructional facilities and supplies, amounted to $601,329 during that period. Additional supplemental funding in the form of Federal and State - Federal matching equipment grants awarded between 1966-1969 totaled more than $140,000.

Considering the profile of the Animal Science program from a chronological point of view, many developmental changes had occurred since its inception, particularly during the 1965-1969 period. During that time, on a simultaneous basis, many improvements were in evidence, the most significant of these are enumerated briefly as follows:

a. The professional staff was increased from one instructor (a licensed veterinarian) in 1961, to three veterinarians, a laboratory animal scientist and two technical assistants in 1969.

b. The organizing in 1964, of an Animal Science Advisory Committee (see Chapter II, page 67) composed of professional representatives from the Animal Science occupational field was particularly significant in view of the guidance and advisement provided in the developmental period between 1965 and the present.

c. The curriculum underwent four major modifications (see Curricular Models I - IV, pages 51 - 54) during that period. Fundamental changes included deletion of most of the agriculturally-oriented courses, which were present in the beginning program and inserting Animal Science specialty courses in their place. A final alteration which occurred in 1969, included the establishment of a two option curriculum; namely, the Laboratory Animal Science and Veterinary Assistant options.

d. The instructional program was improved significantly when, in addition to increased staffing, the Animal Science Center became available in 1966. Specialized equipment and other supplements to instruction present in this facility enabled a highly conceptualized approach to the development of technical proficiencies, by the student.

e. Professional evaluation of the program, made possible by funds from the federal contract, provided continuous "input" from graduates and employers regarding curricular and training effectiveness. Several curricular changes and alterations of individual courses, resulted from the availability of this type of data.

f. Services and resources available to students at this College also increased appreciably during the developmental period. Academic counseling, guidance and career planning advisement specialists were added to the College staff. A library, instructional complex constructed in 1966, expanded the academic resources available to the student. Housing and health services were also improved during this period.

Simultaneous to the program changes and improvements, just enumerated, which occurred during the developmental period, the student enrollment accelerated to 125 entering freshmen in September 1969.

At the conclusion of the developmental period (1961-1969) the Animal Science instructional facilities and technical curriculum had been modified and improved so significantly that special attention alluding to the present status of these two components of the program, is hereby provided.

a. Facilities, Equipment and Special Instructional Materials

A two floor, concrete block structure containing 8,300 square feet of space and located adjacent to the main Campus area was selected, to become the Animal Science Center. Interior redesign and customized alterations resulted in transformation of this facility into an effectively outfitted and equipped instructional complex consisting of basic science, clinical, surgical and radiological laboratories, an animal vivarium and several ancillary areas needed to support the operations of the instructional laboratories. The specialized equipment and instrumentation available in this facility enabled an effective conceptual and applied approach to the development of techniques and skills required for employment in the Animal Science professional field.

b. The Curriculum

A combination of factors including specialized instructional facilities, increasing amounts of technical equipment, "feed back" information from professional evaluators and an enlarged professional staff committed to the philosophy and objectives of this program, were primarily responsible for the changes which resulted in the evolvement of the present curriculum. This curriculum (shown as Curricular Model IV - Chapter II, Page 54) consisted of a basic core during the first year.

During the second year of the program, in addition to completing additional components of a modified core, the student also had the prerogative of selecting one of two options (Laboratory Animal Science and Veterinary Assisting) or a combination of both, in preparing for specialty employment or for a cluster of occupations in the Animal Science professional field. It was a fundamental objective of this curriculum to prepare the student to become a contributing member of society, as well as a trained paraprofessional in this technology.

A comprehensive account of the formal evaluation of the curricular program was presented in Chapter VI of this document. Information relating to evaluation methods, construction of data gathering instruments, data collection and analysis was presented. Additionally, a review of the findings (results from evaluation) forthcoming from employed graduates, their employers and graduates involved in continuing education, was presented along with subsequent curricular recommendations resulting from this study. A brief summation relating to the effectiveness of the instructional program as shown by the evaluation data, suggested that:

a. Employees (graduates) and employers reflected favorably upon the skills and abilities gained in the primary areas of training.

b. Employers of graduates considered 83% of them "well qualified" for their present positions. The remaining 17% were rated "qualified".

A detailed review of the findings and recommendations are presented at the conclusion of Chapter VI.

II. Recommendations

The recommendations forthcoming in this report resulted in part from a review of operational and developmental materials accrued since the inception of the Animal Science program. Additional "input" was received from faculty and staff members within this department and from Animal Science students. Survey information which resulted from the professional evaluation of this program also represented an important source for ideas reflected in this section of the report.

Following a thorough consideration of all available data, it is recommended:

a. That qualifications for faculty members providing technical instruction in this program should include; appropriate academic training, extensive "field" experience and an appreciation of "human relations" factors. All of these are important in effectively instructing and advising the student.

b. That the effectiveness of the instructional program, particularly the development of skills and techniques, is substantially dependent upon the availability of specialized facilities and equipment.

c. That limited sized laboratory sections which will assure close supervision of the student by the instructor in skills development exercises, be provided in every technical laboratory related course.

d. That the technical curriculum be directed exclusively toward paraprofessional career training and that any preparation toward continuing education be incidental to, not an objective of the program.

e. That the content of required courses in general education subject areas be designed to reflect relevence and application to the technology curriculum.

f. That all technically oriented courses be instructed on an applied and conceptual basis and include content which is current and relevant to this technology.

g. That field trips to biomedical laboratories and veterinary hospitals, which provide excellent learning experiences for the student, be integrated as a routine part of the instructional program.

h. That the instructional program be directed toward familiarizing the student with the College Library and the importance of reading current technical literature in his field of educational and career endeavor.

i. That summer work experience in one of the animal science career fields be strongly recommended for the student after completion of the first year of the program.

j. That continuous evaluation "follow up" studies be completed on each class of graduates and their employers, as a means of monitering the curricular and instructional quality of the program.

k. That faculty advisement be completed on a basis which is meaningful to the student in need of insights with which to establish both personal and professional goals.

l. That conscientious efforts be made by the College Admissions Office to use career motivation, goal orientation and seriousness of purpose, along with academic qualification in selection of applicants for entry into this type of technical program.

m. That an effective liaison and productive working relationship with Colledg Administrative personnel be established and maintained to keep this faction informed of the status of the program in terms of accomplishments, problems and need for support.

n. That the resources and influences of technical societies and associations proximal to the Animal Science professional field be used in the instructional program and to assist in the career placement of graduates.

o. That the Technical Advisory Committee selected to offer guidance and direction to the Animal Science Program be kept in an "up to date" status at all times regarding its progress and be contacted as often as necessary in obtaining advise and information important to the operation of the program.

p. That administrators considering Animal Science Technology for inclusion into their technical curricular offerings, be aware that it is a costly program, both to initiate and maintain.

q. That a veterinary clinic be available within the instructional facility to provide "on the job" practice and experience to veterinary assistant option students.

r. That provisions be made for the availability of a full time animal attendant to coordinate and assist in the routine care and maintenance of laboratory animals in the vivarial area.

APPENDIX A-1

STATE UNIVERSITY OF NEW YORK
AGRICULTURAL & TECHNICAL COLLEGE
DELHI, NEW YORK

To be completed
by Graduates Now
Employed

SCHEDULE
FORM A

FOLLOW-UP STUDY
OF
ANIMAL SCIENCE GRADUATES

For Coding Only

1. General Information

___ ___ ___ ___
1 2 3 4

Name of employer ______________________________

___ ___ ___
5 6 7

Name ______________________________

___ ___ ___
8 9 10

Age ______

___ ___
11 12

Sex M F

___
13

Year graduated from Animal Science Program 19___

___ ___
14 15

Present Job Title ______________________________

___ ___
16 17

Length of time in present job: Circle one.

(1) Under 3 months	(4) 1 year to 2 years
(2) 3 - 6 months	(5) 2 years to 3 years
(3) 6 - 12 months	(6) Over 3 years

___
18

What are the major duties and responsibilities in your present position?

(1) ______________________________

(2) ______________________________

(3) ______________________________

(4) ______________________________

(5) ______________________________

Is this the kind of work you prepared for at SUNY-ATC at Delhi?

Yes ___ (1) No ___ (2)

___
19

If answer is no, why did you not enter the job for which you prepared?

____

____

If answer is no in item above, stop at this point. If answer is yes, continue.

APPENDIX A-1

Based upon the training received at SUNY-ATC at Delhi, how qualified do you feel to carry out the duties and responsibilities listed previously.
Check one only.

Not qualified ___ (1)

Meets minimum qualification ___ (2)

Well-qualified ___ (3) ___ 20

What factors contribute to your satisfaction or dissatisfaction with your present job? Check only those which apply.

	Satisfaction	Dissatisfaction	
21 Opportunity for Advancement	___ (1)	___ (2)	___ 21
22 Working Conditions	___ (1)	___ (2)	___ 22
23 Salary	___ (1)	___ (2)	___ 23
24 Other (please list) ___	___ (1)	___ (2)	___ 24

What degree of overall satisfaction do you have with your present job?

(1) ___ Extremely well satisfied
(2) ___ Satisfied
(3) ___ Indifferent
(4) ___ Dissatisfied
(5) ___ Extremely dissatisfied ___ 25

Do you plan to stay in this type of work? Yes ___ (1) No ___ (2). ___ 26

If yes, indicate your major reason for staying ___

___

If no, indicate your major reason for wanting to change. ___

___

APPENDIX A-1

DIRECTIONS FOR COMPLETING THE REMAINING PART OF THIS FORM

II. Specific Information Regarding Training Program; Knowledge, Skills, and/or Abilities Gained During Your Study Period at Delhi

Rating by Graduate

Two specific concerns are listed in the instrument below. The first concern is the need for the specific knowledge or ability. You are asked to rate this according to the following scale:

(E) ESSENTIAL - Used regularly in the performance of my job.
(D) DESIRABLE - Makes my job easier to perform.
(U) UNNECESSARY - Not needed on this job.

The second concern is the adequacy of your training received in the Animal Science Program at Delhi. The following scale will be used in determining this:

(S) SUPERIOR - Provided outstanding preparation for my job.
(A) ADEQUATE - Provided necessary preparation in my job.
(I) INADEQUATE - Did not prepare me adequately for my job.
(NA) NOT AVAILABLE - No opportunity to secure the training while I was enrolled.
(DNA) DOES NOT APPLY - No relevance to my job.

For each knowledge or ability, check one column in need and one in adequacy before proceeding to the next item.

Note: This sheet may be detached and the above key be used as a reference when completing the remainder of the questionnaire.

Name ____________________

(1-10) For Coding Only

APPENDIX A-1

AREA I - General

Knowledge or Ability		Rating by Graduates Now Employed								
		Need for Training				Adequacy of Training				
		E (1)	D (2)	U (3)		S (1)	A (2)	I (3)	NA (4)	DNA (5)
Ability to accept and carry out responsibility.	11				31					
Ability to get along with people.	12				32					
Ability to follow directions.	13				33					
Ability to assume initiative when necessary.	14				34					
Ability to communicate in oral expression.	15				35					
Ability to communicate in written language.	16				36					
Ability to use technical journals and other library resources.	17				37					
Ability to prepare and deliver a speech.	18				38					
Ability to keep adequate records.	19				39					
Ability to serve as a general receptionist.	20				40					
Ability to write a technical report.	21				41					
Ability to interpret technical language.	22				42					
Ability to present a demonstration.	23				43					
Ability to supervise other less skilled employees.	24				44					
Ability to handle routine mathematical problems.	25				45					
Knowledge of how our economic system operates.	26				46					
Knowledge of our form of government and role of governmental regulations.	27				47					
Knowledge of the ethical practices involved in animal technology.	28				48					
Knowledge of laws regarding humane treatment of animals.	29				49					
Ability to "grow" on the job.	30				50					
Other*										

*Additional items may be added in the blank spaces provided.

APPENDIX A-1

Name ______________________

(1-10) For Coding Only

AREA II - Anatomy, Physiology and Histology

Rating by Graduates Now Employed

Knowledge or Ability		Need for Training				Adequacy of Training				
		E (1)	D (2)	U (3)		S (1)	A (2)	I (3)	NA (4)	DNA (5)
Knowledge of the definitions, descriptive terms, and other language of the field.	11				28					
Knowledge of microscopic and gross anatomy.	12				29					
Knowledge of the anatomy of the muscular system.	13				30					
Knowledge of the physiology of the muscular system.	14				31					
Knowledge of the anatomy of the digestive system.	15				32					
Knowledge of the physiology of the digestive system.	16				33					
Knowledge of the anatomy of the respiratory system.	17				34					
Knowledge of the physiology of the respiratory system.	18				35					
Knowledge of the anatomy of the urogenital system.	19				36					
Knowledge of the physiology of the urogenital system.	20				37					
Knowledge of the anatomy of the endocrine system.	21				38					
Knowledge of the physiology of the endocrine system.	22				39					
Knowledge of the anatomy of the circulatory system.	23				40					
Knowledge of the physiology of the circulatory system.	24				41					
Knowledge of the anatomy of the nervous system.	25				42					
Knowledge of the physiology of the nervous system.	26				43					
Knowledge of the applications of anatomy & physiology.	27				44					
Other*										

Name ______________________

(1-10) For Coding Only

APPENDIX A-1

AREA III - Animal Care and Nutrition

Knowledge or Ability		Rating by Graduates Now Employed Need for Training E (1)	D (2)	U (3)		Adequacy of Training S (1)	A (2)	I (3)	NA (4)	DNA (5)
Knowledge of general livestock production.	11				38					
Knowledge of specific livestock classes - Dairy cattle, swine, sheep, horses and poultry.	12				39					
Knowledge of other domesticated animals including laboratory animals.	13				40					
To understand the general principles of nutrition.	14				41					
To understand the nutritive needs of animals of different classes.	15				42					
To understand how different classes of animals utilize various feeds.	16				43					
To understand the process of digestion and absorption of feed by animals.	17				44					
To be able to interpret feed analysis reports.	18				45					
To be able to figure TDN, nutritive ratio, and net energy of feeds.	19				46					
To know the mineral needs of animals.	20				47					
To know the vitamin needs of animals.	21				48					
To be able to care for, including caging, bedding, and feeding of animals.	22				49					
To be able to apply methods of restraint to animals.	23				50					
To know the factors involved in humane treatment of animals.	24				51					
To be able to apply an adequate sanitation program to various animals.	25				52					
To be able to administer or assist in administering anesthesia to animals.	26				53					
To know and understand the reasons for euthanasia in animals .	27				54					
To understand the legal requirements regarding animals used in research .	28				55					
To be able to identify symptoms of ill-health.	29				56					
To be able to organize a breeding program for laboratory animals.	30				57					
To be able to collect specimens of blood.	31				58					
To know proper autopsy and disposal methods.	32				59					
To understand and care for gnotobiote animals.	33				60					
To know how to handle and care for axenic animals.	34				61					
To understand the principles of heredity.	35				62					
A knowledge of the problems caused by heredity variation.	36				63					
Other*	37				64					

Name ______________________ APPENDIX A-1 ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

(1-10) For Coding Only

AREA IV - Parasitology, Hematology, Pathology and Food Inspection

Rating by Graduates Now Employed

Knowledge or Ability		Need for Training				Adequacy of Training				
		E	D	U		S	A	I	NA	DNA
		(1)	(2)	(3)		(1)	(2)	(3)	(4)	(5)
Understand the nature of micro-organisms as they relate to human endeavor.	11				26					
Knowledge of basic principles involved in classifying and identifying the common micro-organisms.	12				27					
Knowledge of disease transmission.	13				28					
Knowledge of the diseases of animals that are hazardous to human health.	14				29					
Ability to understand methods, procedures and records used in animal research.	15				30					
To be able to perform basic hematological procedures.	16				31					
Ability to examine animal cell structure.	17				32					
Ability to prepare animal tissue for examination.	18				33					
Knowledge of the life cycles of common animal parasites.	19				34					
Ability to identify internal and external parasites in animals.	20				35					
Knowledge of food inspection enforcement procedures.	21				36					
Understand the relationship of inspection to public health.	22				37					
Understand the principles of food plant sanitation.	23				38					
Ability to interpret and use farm and plant inspection reports.	24				39					
Ability to use microscopic plate methods for bacterial analysis.	25				40					

Name ______________________ APPENDIX A-1 (1-10) For Coding Only

AREA V - Scientific Instrumentation and Laboratory Equipment

Rating by Graduates Now Employed

Knowledge or Ability		Need for Training				Adequacy of Training				
		E	D	U		S	A	I	NA	DNA
		(1)	(2)	(3)		(1)	(2)	(3)	(4)	(5)
Knowledge of ethaire anesthetic machine.	11				42					
Knowledge of electro-anesthesia equipment.	12				43					
Knowledge of multiple inhalant anesthetic machine.	13				44					
Ability to operate electric sterilizer.	14				45					
Ability to use pre-surgical preparation equipment.	15				46					
Ability to use oxygen equipment for emergency purposes.	16				47					
Know complete operation and cycles of autotechnicon.	17				48					
Understand principles and operation of lyophylizing apparatus.	18				49					
Understand principles and operation of F. A. scopes.	19				50					
Understand operation of microtome and accessory equipment.	20				51					
Understand principles and operation of Coulter Particle counter.	21				52					
Ability to use "Spectronic 20" Photocolorimeter.	22				53					
Ability to use mettler analytical balance.	23				54					
Ability to use hematocrit centrifuges.	24				55					
Ability to use blood cell counting chambers & equipment.	25				56					
Ability to use the spencer hemoglobinometer.	26				57					
Ability to understand and use pulmonary function equipment.	27				58					
Ability to understand physiological principles as demonstrated by use of a physiograph machine.	28				59					
Know how to operate an autoclave.	29				60					
Understand and operate x-ray equipment, including taking a roentgenogram.	30				61					
Understand how to develop the x-ray negative.	31				62					
Know the principles and uses of Axenic equipment and techniques.	32				63					
Ability to operate a modern cage washing machine.	33				64					
Ability to operate an animal incinerator.	34				65					
Understand principles and operation of the Infrared Spectrophotometer.	35				66					
Understand principles and operation of the Flame Photometer.	36				67					
Understand principles and operation Gas Chromatographs.	37				68					
Understand principles and operation of Paper Chromatographs	38				69					
Understand principles and operation of Electrophoresis Equipment	39				70					
Understand principles and operation of Ion Exchange Equipment	40				71					
Ability to use pH Meters	41				72					

APPENDIX A-2

STATE UNIVERSITY OF NEW YORK
AGRICULTURAL & TECHNICAL COLLEGE
DELHI, NEW YORK

To be completed by employers

SCHEDULE FORM B

EVALUATION OF GRADUATES BY EMPLOYERS

For Coding Only

I. General Information

___ ___ ___ ___
1 2 3 4

Name of Employer ______________________________

___ ___ ___
5 6 7

Address of Employer ______________________________
____
____

Name of SUNY-ATC Delhi graduate in your employment __
____

___ ___ ___
8 9 10

Job title now being filled by graduate ______________
____

What are the duties and responsibilities of the worker in this job title?
(1) ______________________________
(2) ______________________________
(3) ______________________________
(4) ______________________________
(5) ______________________________

List all other job titles in your business which you feel this graduate is capable of filling as of now __
____
____

How qualified do you feel this graduate is in his present job title? Check one.
Well qualified ___ (1)   Meets minimum qualification ___ (2)
Not qualified ___ (3)

___
11

How are persons employed in this job title usually given advancement? Check (v) only one answer

___
12

____ 1. Salary increases only.
____ 2. More responsibility within this job title only.
____ 3. Both 1 and 2
____ 4. Promotion to another job title.
____ 5. Not given advancement.
____ 6. Proprietor, does not apply.

APPENDIX A-2

DIRECTIONS FOR COMPLETING THE REMAINING PART OF THIS FORM

II. Specific Information Regarding Training Program; Knowledge or Ability Gained by Employee While Enrolled at Delhi.

Rating by Employer

Two specific concerns are listed in the instrument below. The first concern is the need for the specific knowledge or skill. You are asked to rate this according to the following scale:

(E) ESSENTIAL - Used regularly in the performance of this job.
(D) DESIRABLE - Makes this job easier to perform.
(U) UNNECESSARY - Not needed on this job.

The second concern is the adequacy of the training received by this employee while enrolled in the Animal Science Program at Delhi. The following scale will be used in determining this:

(S) SUPERIOR - Provided outstanding preparation for this job.
(A) ADEQUATE - Provided necessary preparation in this job.
(I) INADEQUATE - Did not prepare employee adequately for this job.
(DNA) DOES NOT APPLY - No relevance to this job.

For each knowledge or ability, check one column in need and one in adequacy before proceeding to the next item.

Note: This sheet may be detached and the above key used as reference when completing the remainder of the questionnaire.

Name ______________________

APPENDIX A-2

(1-10) For Coding Only

AREA I - General

Knowledge or Ability		Rating by Employer							
		Need for Training				Adequacy of Training			
		E (1)	D (2)	U (3)		S (1)	A (2)	I (3)	DNA (4)
Ability to accept and carry out responsibility.	11				31				
Ability to get along with people.	12				32				
Ability to follow directions.	13				33				
Ability to assume initiative when necessary.	14				34				
Ability to communicate in oral expression.	15				35				
Ability to communicate in written language.	16				36				
Ability to use technical journals and other library resources.	17				37				
Ability to prepare and deliver a speech.	18				38				
Ability to keep adequate records.	19				39				
Ability to serve as a general receptionist.	20				40				
Ability to write a technical report.	21				41				
Ability to interpret technical language.	22				42				
Ability to present a demonstration.	23				43				
Ability to supervise other less skilled employees.	24				44				
Ability to handle routine mathematical problems.	25				45				
Knowledge of how our economic system operates.	26				46				
Knowledge of our form of government and role of governmental regulations.	27				47				
Knowledge of the ethical practices involved in animal technology.	28				48				
Knowledge of laws regarding humane treatment of animals.	29				49				
Ability to "grow" on the job.	30				50				
Other*									

*Additional items may be added in the blank spaces provided.

Name ______________________ APPENDIX A-2 ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ (1-10) For Coding Only

AREA II - Anatomy, Physiology and Histology

Rating by Employer

Knowledge or Ability		Need for Training				Adequacy of Training			
		E	D	U		S	A	I	DNA
		(1)	(2)	(3)		(1)	(2)	(3)	(4)
Knowledge of the definitions, descriptive terms, and other language of the field.	11				28				
Knowledge of microscopic and gross anatomy.	12				29				
Knowledge of the anatomy of the muscular system.	13				30				
Knowledge of the physiology of the muscular system.	14				31				
Knowledge of the anatomy of the digestive system.	15				32				
Knowledge of the physiology of the digestive system.	16				33				
Knowledge of the anatomy of the respiratory system.	17				34				
Knowledge of the physiology of the respiratory system.	18				35				
Knowledge of the anatomy of the urogenital system.	19				36				
Knowledge of the physiology of the urogenital system.	20				37				
Knowledge of the anatomy of the endocrine system.	21				38				
Knowledge of the physiology of the endocrine system.	22				39				
Knowledge of the anatomy of the circulatory system.	23				40				
Knowledge of the physiology of the circulatory system.	24				41				
Knowledge of the anatomy of the nervous system.	25				42				
Knowledge of the physiology of the nervous system.	26				43				
Knowledge of the applications of anatomy and physiology	27				44				
Other*									

Name ____________________

APPENDIX A-2

(1-10) For Coding Only

AREA III - Animal Care and Nutrition

Rating by Employer

Knowledge or Ability		Need for Training E (1)	D (2)	U (3)		Adequacy of Training S (1)	A (2)	I (3)	DNA (4)
Knowledge of general livestock production.	11				38				
Knowledge of specific livestock classes - dairy cattle, swine, sheep, horses and poultry.	12				39				
Knowledge of other domesticated animals including laboratory animals.	13				40				
To understand the general principles of nutrition.	14				41				
To understand the nutritive needs of animals of different classes.	15				42				
To understand how different classes of animals utilize various feeds.	16				43				
To understand the process of digestion and absorption of feed by animals.	17				44				
To be able to interpret feed analysis reports.	18				45				
To be able to figure TDN, nutritive ratio, and net energy of feeds.	19				46				
To know the mineral needs of animals.	20				47				
To know the vitamin needs of animals.	21				48				
To be able to care for, including caging, bedding, and feeding of animals.	22				49				
To be able to apply methods of restraint to animals.	23				50				
To know the factors involved in humane treatment of animals.	24				51				
To be able to apply an adequate sanitation program to various animals.	25				52				
To be able to administer or assist in administering anesthesia to animals.	26				53				
To know and understand the reasons for euthanasia in animals.	27				54				
To understand the legal requirements regarding animals used in research.	28				55				
To be able to identify symptoms of ill-health.	29				56				
To be able to organize a breeding program for laboratory animals.	30				57				
To be able to collect specimens of blood.	31				58				
To know proper autopsy and disposal methods.	32				59				
To understand and care for gnotobiote animals.	33				60				
To know how to handle and care for axenic animals.	34				61				
Understand the principles of heredity.	35				62				
Knowledge of the problems caused by heredity variation.	36				63				
Other*	37				64				

Name ______________________ APPENDIX A-2 ___ (1-10) For Coding Only ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

AREA IV - Parasitology, Hematology, Pathology and Food Inspection

		Rating by Employer							
Knowledge or Ability		Need for Training				Adequacy of Training			
		E	D	U		S	A	I	DNA
		(1)	(2)	(3)		(1)	(2)	(3)	(4)
Understand the nature of micro-organisms as they relate to human endeavor.	11				26				
Knowledge of basic principles involved in classifying and identifying the common micro-organisms.	12				27				
Knowledge of disease transmission.	13				28				
Knowledge of the diseases of animals that are hazardous to human health.	14				29				
Ability to understand methods, procedures and records used in animal research.	15				30				
To be able to perform basic hematological procedures.	16				31				
Ability to examine animal cell structure.	17				32				
Ability to prepare animal tissue for examination.	18				33				
Knowledge of the life cycles of common animal parasites.	19				34				
Ability to identify internal and external parasites in animals.	20				35				
Knowledge of food inspection enforcement procedures.	21				36				
Understand the relationship of inspection to public health.	22				37				
Understand the principles of food plant sanitation.	23				38				
Ability to interpret and use farm and plant inspection reports.	24				39				
Ability to use microscopic plate methods for bacterial analysis	25				40				

Name ____________________ APPENDIX A-2 (1-10) For Coding Only

AREA V - Scientific Instrumentation and Laboratory Equipment

Knowledge or Ability		Need for Training				Adequacy of Training			
		E (1)	D (2)	U (3)		S (1)	A (2)	I (3)	DNA (4)
Knowledge of ethaire anesthetic machine.	11				42				
Knowledge of electro-anesthesia equipment.	12				43				
Knowledge of multiple inhalant anesthetic machine.	13				44				
Ability to operate electric sterilizer.	14				45				
Ability to use pre-surgical preparation equipment.	15				46				
Ability to use oxygen equipment for emergency purposes.	16				47				
Know complete operation and cycles of autotechnicon.	17				48				
Understand principles and operation of lyophylizing apparatus.	18				49				
Understand principles and operation of F. A. scopes.	19				50				
Understand operation of microtome and accessory equipment.	20				51				
Understand principles and operation of Coulter Particle counter.	21				52				
Ability to use "Spectronic 20" Photocolorimeter.	22				53				
Ability to use mettler analytical balance.	23				54				
Ability to use hematocrit centrifuges.	24				55				
Ability to use blood cell counting chambers & equipment.	25				56				
Ability to use the spencer hemoglobinometer.	26				57				
Ability to understand and use pulmonary function equipment.	27				58				
Ability to understand physiological principles as demonstrated by use of a physiograph machine.	28				59				
Know how to operate an autoclave.	29				60				
Understand and operate x-ray equipment, including taking a roentgenogram.	30				61				
Understand how to develop the x-ray negative.	31				62				
Know the principles and uses of Axenic equipment and techniques.	32				63				
Ability to operate a modern cage washing machine.	33				64				
Ability to operate an animal incinerator.	34				65				
Understand principles and operation of the Infrared Spectrophotometer.	35				66				
Understand principles and operation of the Flame Photometer	36				67				
Understand principles and operation of Gas Chromatographs.	37				68				
Understand principles and operation of Paper Chromatographs	38				69				
Understand principles and operation of Electrophoresis equipment.	39				70				
Understand principles and operation of Ion Exchange Equipment.	40				71				
Ability to use pH Meters.	41				72				

APPENDIX A-3

STATE UNIVERSITY OF NEW YORK
AGRICULTURAL & TECHNICAL COLLEGE
DELHI, NEW YORK

To be completed by graduates pursuing further education

SCHEDULE FORM A-1

FOLLOW-UP STUDY OF ANIMAL SCIENCE GRADUATES

For Coding Only

I. General Information ___ 1 ___ 2 ___ 3 ___ 4

Name ______________________________ ___ 5 ___ 6 ___ 7

Age ________ ___ 8 ___ 9

Sex M F ___ 10

Year graduated from Animal Science Program 19___ ___ 11 ___ 12

Name of educational institution at which you are now enrolled

____

Type of institution: Check one. 2 year ___ (1) 4 year ___ (2)

Other ______________________________ (3) ___ 13

What is your present major field of study? __________

____

How many credits were you able to transfer from Delhi to your present educational institution? Term hours ______ ___ 14 ___ 15

Semester hours ______ ___ 16 ___ 17

Are you a degree candidate? Yes ___ (1) No ___ (2) ___ 18

If answer is yes, for what degree are you a candidate? ____________

When did you decide to continue your formal education beyond that received at Delhi? Check one.

Prior to enrolling at Delhi ___ (1)
While in attendance at Delhi ___ (2)
After graduating from Delhi ___ (3) ___ 19

What do you intend to do when you complete your present training? (Occupational job title you seek) __________

____

APPENDIX A-3

DIRECTIONS FOR COMPLETING THE REMAINING PART OF THIS FORM

II. Specific Information Regarding Training Program; Knowledge or Ability Gained During Your Study Period at Delhi.

Rating by Graduates Pursuing Further Education

You are requested to reflect on the adequacy of your training received in the Animal Science Program at Delhi as it relates to your present educational objective.

(S) SUPERIOR - Provided outstanding preparation for continuing my education.
(A) ADEQUATE - Provided adequate preparation for continuing my education.
(I) INADEQUATE - Did not prepare me adequately for further education
(B) BENEFICIAL - Useful education but not particularly applicable to my present educational objective.

Check only one category under each item.

Note: This sheet may be detached and the above key be used as reference when completing the remainder of the questionnaire.

Name ______________________

APPENDIX A-3

___ ___ ___ ___ ___ ___ ___
(1-7) For Coding Only

AREA I - General

Knowledge or Ability		Rating by Graduates Pursuing Further Education			
		S (1)	A (2)	I (3)	B (4)
Ability to accept and carry out responsibility.	20				
Ability to get along with people.	21				
Ability to follow directions.	22				
Ability to assume initiative when necessary.	23				
Ability to communicate in oral expression.	24				
Ability to communicate in written language	25				
Ability to use technical journals and other library resources.	26				
Ability to prepare and deliver a speech.	27				
Ability to keep adequate records.	28				
Ability to serve as a general receptionist.	29				
Ability to handle telephone requests for information	30				
Ability to interpret technical language.	31				
Ability to present a demonstration.	32				
Ability to supervise other less skilled employees	33				
Ability to handle routine mathematical problems.	34				
Knowledge of how our economic system operates.	35				
Knowledge of our form of government and role of governmental regulations.	36				
Knowledge of the ethical practices involved in animal technology.	37				
Knowledge of laws regarding humane treatment of animals.	38				
Ability to "grow" on the job	39				
Other*					

*Additional items may be added in the blank spaces provided.

Name ______________________

APPENDIX A-3

___ ___ ___ ___ ___ ___ ___
(1-7) For Coding Only

AREA II - Anatomy, Physiology and Histology

Knowledge or Ability		Rating by Graduates Pursuing Further Education S (1)	A (2)	I (3)	B (4)
Knowledge of the definitions, descriptive terms, and other language of the field	8				
Knowledge of microscopic and gross anatomy.	9				
Knowledge of the anatomy of the muscular system.	10				
Knowledge of the physiology of the muscular system.	11				
Knowledge of the anatomy of the digestive system.	12				
Knowledge of the physiology of the digestive system.	13				
Knowledge of the anatomy of the respiratory system	14				
Knowledge of the physiology of the respiratory system.	15				
Knowledge of the anatomy of the urogenital system.	16				
Knowledge of the physiology of the urogenital system.	17				
Knowledge of the anatomy of the endocrine system.	18				
Knowledge of the physiology of the endocrine system.	19				
Knowledge of the anatomy of the circulatory system.	20				
Knowledge of the physiology of the circulatory system.	21				
Knowledge of the anatomy of the nervous system.	22				
Knowledge of the physiology of the nervous system.	23				
Knowledge of the applications of anatomy and physiology.	24				
Other*					

Name ______________________________

(1-7) For Coding Only ____ ____ ____ ____ ____

APPENDIX A-3

AREA III - Animal Care and Nutrition

Knowledge or Ability		Rating by Graduates Pursuing Further Education			
		S (1)	A (2)	I (3)	B (4)
Knowledge of general livestock production.	25				
Knowledge of specific livestock classes - dairy cattle, swine, sheep, horses and poultry.	26				
Knowledge of other domesticated animals including laboratory animals.	27				
To understand the general principles of nutrition.	28				
To understand the nutritive needs of animals of different classes.	29				
To understand how different classes of animals utilize various feeds	30				
To understand the process of digestion and absorption of feed by animals.	31				
To be able to interpret feed analysis reports.	32				
To be able to figure TDN, nutritive ratio, and net energy of feeds.	33				
To know the mineral needs of animals.	34				
To know the vitamin needs of animals.	35				
To be able to care for, including caging, bedding, and feeding of animals.	36				
To be able to apply methods of restraint to animals.	37				
To know the factors involved in humane treatment of animals.	38				
To be able to apply an adequate sanitation program to various animals.	39				
To be able to administer or assist in administering anesthesia to animals.	40				
To know and understand the reasons for euthanasia in animals.	41				
To understand the legal requirements regarding animals used in research.	42				
To be able to identify symptoms of ill-health.	43				
To be able to organize a breeding program for laboratory animals.	44				
To be able to collect specimens of blood.	45				
To know proper autopsy and disposal methods.	46				
To understand and care for gnotobiote animals.	47				
To know how to handle and care for axenic animals.	48				
Understand the principles of heredity.	49				
Knowledge of the problems caused by heredity variation.	50				
Other					

Name ______________________________

APPENDIX A-3

(1-7) For Coding Only

AREA IV - Parasitology, Hematology, Pathology and Food Inspection

Knowledge or Ability		Rating by Graduates Pursuing Further Education			
		S (1)	A (2)	I (3)	B (4)
Understand the nature of micro-organisms as they relate to human behavior.	8				
Knowledge of basic principles involved in classifying and identifying the common micro-organisms.	9				
Knowledge of disease transmission.	10				
Knowledge of the diseases of animals that are hazardous to human health.	11				
Ability to understand methods, procedures and records used in animal research.	12				
To be able to perform basic hematological procedures.	13				
Ability to examine animal cell structure.	14				
Ability to prepare animal tissue for examination.	15				
Knowledge of the life cycles of common animal parasites.	16				
Ability to identify internal and external parasites in animals	17				
Knowledge of food inspection enforcement procedures.	18				
Understand the relationship of inspection to public health.	19				
Understand the principles of food plant sanitation.	20				
Ability to interpret and use farm and plant inspection reports.	21				
Ability to use microscopic plate methods for bacterial analysis.	22				

Name ______________________

APPENDIX A-3

___ ___ ___ ___ ___ ___ ___
(1-7) For Coding Only

AREA V - Scientific Instrumentation and Laboratory Equipment

Knowledge or Ability		Rating by Graduates Pursuing Further Education			
		S (1)	A (2)	I (3)	B (4)
Knowledge of ethaire anesthetic machine	23				
Knowledge of electro-anesthesia equipment.	24				
Knowledge of multiple inhalant anesthetic machine.	25				
Ability to operate electric sterilizer.	26				
Ability to use pre-surgical preparation equipment.	27				
Ability to use oxygen equipment for emergency purposes.	28				
Know complete operation and cycles of autotechnicon.	29				
Understand principles and operation of lyophylizing apparatus.	30				
Understand principles and operation of F. A. Scopes	31				
Understand operation of microtome and accessory equipment.	32				
Understand principles and operation of Coulter Particle counter	33				
Ability to use "Spectronic 20" Photocolorimeter.	34				
Ability to use mettler analytical balance.	35				
Ability to use hematocrit centrifuges.	36				
Ability to use blood cell counting chambers and equipment.	37				
Ability to use the spencer hemoglobinometer.	38				
Ability to understand and use pulmonary function equipment.	39				
Ability to understand physiological principles as demonstrated by use of a physiograph machine.	40				
Know how to operate an autoclave.	41				
Understand and operate x-ray equipment, including making a roentgenogram.	42				
Understand how to develop the x-ray negative.	43				
Know the principles and uses of Axenic equipment and techniques.	44				
Ability to operate a modern cage washing machine.	45				
Ability to operate an animal incinerator.	46				
Understand principles and operation of the Infrared Spectrophotometer.	47				
Understand principles and operation of the Flame Photometer.	48				
Understand principles and operation of Gas Chromatographs.	49				
Understand principles and operation of Paper Chromatographs.	50				
Understand principles and operation of Electrophoresis equipment	51				
Understand principles and operation of Ion Exchange Equipment	52				
Ability to use pH Meters.	53				

APPENDIX A-4

Name of Graduate: ______________________________ Year Graduated ______

Name of Employer: ____

Address of Employer: ____

Job Title: ____

Duties and Responsibilities: _____________________________________

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(1-10) For Coding Only

APPENDIX B-1

AREA I - General

GRAND TOTALS, CLASSES 1965-1968

Form A (N = 69)

Knowledge or Ability		Rating by Graduates Now Employed								
		Need for Training				Adequacy of Training				
		E (1)	D (2)	U (3)		S (1)	A (2)	I (3)	NA (4)	DNA (5)
Ability to accept and carry out responsibility.	11	60	2	0	31	10	45	5	3	2
Ability to get along with people.	12	55	9	0	32	13	36	6	4	0
Ability to follow directions.	13	52	5	1	33	17	39	2	0	2
Ability to assume initiative when necessary.	14	51	8	0	34	8	35	12	3	2
Ability to communicate in oral expression.	15	38	24	0	35	12	32	15	2	0
Ability to communicate in written language.	16	20	26	12	36	17	33	4	0	7
Ability to use technical journals and other library resources.	17	17	27	17	37	12	33	5	1	9
Ability to prepare and deliver a speech.	18	4	9	48	38	8	18	7	2	27
Ability to keep adequate records.	19	45	14	3	39	13	39	7	2	1
Ability to serve as a general receptionist.	20	21	17	22	40	4	21	11	6	16
Ability to write a technical report.	21	15	13	33	41	10	26	10	1	16
Ability to interpret technical language.	22	39	19	4	42	17	31	8	1	4
Ability to present a demonstration.	23	7	15	38	43	2	27	7	2	24
Ability to supervise other less skilled employees.	24	26	18	16	44	4	22	16	9	10
Ability to handle routine mathematical problems.	25	24	25	14	45	9	38	7	0	9
Knowledge of how our economic system operates.	26	6	13	44	46	3	24	8	1	17
Knowledge of our form of government and role of governmental regulations.	27	21	23	17	47	2	35	6	0	19
Knowledge of the ethical practices involved in animal technology.	28	25	20	10	48	20	35	4	1	4
Knowledge of laws regarding humane treatment of animals.	29	33	21	8	49	26	27	6	0	5
Ability to "grow" on the job.	30	44	12	5	50	10	33	7	6	2[illegible]
Other*										

*Additional items may be added in the blank spaces provided.

Name ______________________________ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

APPENDIX B-1 (continued) (1-10) For Coding Only

AREA II - Anatomy, Physiology and Histology

Rating by Graduates Now Employed

Knowledge or Ability		Need for Training				Adequacy of Training				
		E (1)	D (2)	U (3)		S (1)	A (2)	I (3)	NA (4)	DNA (5)
Knowledge of the definitions, descriptive terms, and other language of the field.	11	46	12	2	28	35	21	9	0	1
Knowledge of microscopic and gross anatomy.	12	39	20	4	29	22	29	6	1	2
Knowledge of the anatomy of the muscular system.	13	22	32	6	30	15	39	7	0	1
Knowledge of the physiology of the muscular system.	14	15	40	5	31	13	39	7	1	1
Knowledge of the anatomy of the digestive system.	15	19	35	5	32	13	42	4	0	1
Knowledge of the physiology of the digestive system.	16	16	36	6	33	12	40	6	1	1
Knowledge of the anatomy of the respiratory system.	17	20	33	8	34	12	43	3	0	2
Knowledge of the physiology of the respiratory system.	18	17	34	8	35	13	37	8	1	0
Knowledge of the anatomy of the urogenital system.	19	18	35	7	36	6	46	7	0	3
Knowledge of the physiology of the urogenital system.	20	17	35	7	37	6	39	12	1	3
Knowledge of the anatomy of the endocrine system.	21	15	39	7	38	5	43	10	1	4
Knowledge of the physiology of the endocrine system.	22	15	39	7	39	5	38	12	2	3
Knowledge of the anatomy of the circulatory system.	23	28	27	7	40	16	37	6	1	1
Knowledge of the physiology of the circulatory system.	24	31	26	4	41	15	37	5	2	2
Knowledge of the anatomy of the nervous system.	25	17	37	7	42	7	41	7	0	2
Knowledge of the physiology of the nervous system.	26	16	38	7	43	7	40	8	3	2
Knowledge of the applications of anatomy & physiology.	27	35	21	4	44	14	36	4	3	2
Other*										

Name ____________________

(1-10) For Coding Only

APPENDIX B-1
(continued)

AREA III - Animal Care and Nutrition

		Rating by Graduates Now Employed								
		Need for Training				Adequacy of Training				
Knowledge or Ability		E (1)	D (2)	U (3)		S (1)	A (2)	I (3)	NA (4)	DNA (5)
Knowledge of general livestock production.	11	8	20	32	38	13	29	1	0	18
Knowledge of specific livestock classes - Dairy cattle, swine, sheep, horses and poultry.	12	4	12	41	39	12	25	0	0	21
Knowledge of other domesticated animals including laboratory animals.	13	32	15	12	40	22	26	3	1	8
To understand the general principles of nutrition.	14	18	28	14	41	15	33	5	0	6
To understand the nutritive needs of animals of different classes.	15	13	23	24	42	11	30	5	0	13
To understand how different classes of animals utilize various feeds.	16	9	19	32	43	7	29	6	0	20
To understand the process of digestion and absorption of feed by animals.	17	13	25	21	44	11	30	4	0	8
To be able to interpret feed analysis reports.	18	6	7	47	45	5	13	8	1	30
To be able to figure TDN, nutritive ratio, and net energy of feeds.	19	3	3	54	46	10	15	3	0	32
To know the mineral needs of animals.	20	9	30	21	47	12	32	5	0	18
To know the vitamin needs of animals.	21	9	33	18	48	12	33	4	0	9
To be able to care for, including caging, bedding, and feeding of animals.	22	33	12	15	49	26	21	2	1	9
To be able to apply methods of restraint to animals.	23	46	5	9	50	20	19	13	2	8
To know the factors involved in humane treatment of animals.	24	43	11	6	51	32	19	2	0	5
To be able to apply an adequate sanitation program to various animals.	25	31	17	12	52	19	29	3	0	8
To be able to administer or assist in administering anesthesia to animals.	26	39	12	9	53	28	17	9	0	8
To know and understand the reasons for euthanasia in animals .	27	41	10	9	54	29	20	4	0	8
To understand the legal requirements regarding animals used in research .	28	19	15	27	55	11	26	8	1	14
To be able to identify symptoms of ill-health.	29	45	12	4	56	19	32	7	0	3
To be able to organize a breeding program for laboratory animals.	30	9	5	46	57	9	20	4	1	26
To be able to collect specimens of blood.	31	34	13	13	58	20	22	11	2	7
To know proper autopsy and disposal methods.	32	28	21	12	59	15	33	4	0	9
To understand and care for gnotobiote animals.	33	4	7	49	60	15	13	2	0	29
To know how to handle and care for axenic animals.	34	3	8	48	61	19	12	1	1	27
To understand the principles of heredity.	35	8	24	29	62	11	23	7	0	20
A knowledge of the problems caused by heredity variation.	36	8	22	31	63	8	23	7	0	22
Other*	37				64					

APPENDIX B-1 (continued)

Name ______________________________

(1-10) For Coding Only

AREA IV - Parasitology, Hematology, Pathology and Food Inspection

Rating by Graduates Now Employed

Knowledge or Ability		Need for Training E (1)	D (2)	U (3)		Adequacy of Training S (1)	A (2)	I (3)	NA (4)	DNA (5)
Understand the nature of micro-organisms as they relate to human endeavor.	11	14	30	17	26	12	34	1	1	13
Knowledge of basic principles involved in classifying and identifying the common micro-organisms.	12	13	29	19	27	13	29	4	0	15
Knowledge of disease transmission.	13	37	20	4	28	24	32	1	0	4
Knowledge of the diseases of animals that are hazardous to human health.	14	33	22	6	29	17	34	2	0	5
Ability to understand methods, procedures and records used in animal research.	15	24	12	24	30	8	26	4	2	22
To be able to perform basic hematological procedures.	16	34	12	15	31	19	27	1	0	8
Ability to examine animal cell structure.	17	8	23	28	32	6	29	7	0	17
Ability to prepare animal tissue for examination.	18	10	10	41	33	13	26	2	0	19
Knowledge of the life cycles of common animal parasites.	19	27	23	11	34	24	27	4	0	6
Ability to identify internal and external parasites in animals.	20	37	17	7	35	24	24	6	0	6
Knowledge of food inspection enforcement procedures.	21	6	4	50	36	6	13	9	2	30
Understand the relationship of inspection to public health.	22	6	9	46	37	4	21	4	1	32
Understand the principles of food plant sanitation.	23	4	5	51	38	4	22	2	2	32
Ability to interpret and use farm and plant inspection reports.	24	3	6	52	39	2	13	5	4	36
Ability to use microscopic plate methods for bacterial analysis.	25	14	16	30	40	8	28	6	1	18

Name ____________

(1-10) For Coding Only

AREA V - Scientific Instrumentation and Laboratory Equipment

Rating by Graduates Now Employed

Knowledge or Ability		Need for Training				Adequacy of Training				
		E (1)	D (2)	U (3)		S (1)	A (2)	I (3)	NA (4)	DNA (5)
Knowledge of ethaire anesthetic machine.	11	13	17	29	42	8	24	8	2	17
Knowledge of electro-anesthesia equipment.	12	2	10	49	43	2	20	9	5	24
Knowledge of multiple inhalant anesthetic machine.	13	12	13	34	44	2	21	13	8	17
Ability to operate electric sterilizer.	14	30	9	22	45	7	23	12	4	13
Ability to use pre-surgical preparation equipment.	15	34	8	19	46	16	25	5	2	12
Ability to use oxygen equipment for emergency purposes.	16	23	17	20	47	5	17	19	6	12
Know complete operation and cycles of autotechnicon.	17	7	6	50	48	10	11	6	5	28
Understand principles and operation of lyophylizing apparatus.	18	7	4	50	49	2	8	13	3	32
Understand principles and operation of F. A. scopes.	19	3	9	49	50	1	9	10	7	31
Understand operation of microtome and accessory equipment.	20	2	5	53	51	3	7	10	5	35
Understand principles and operation of Coulter Particle counter.	21	8	8	45	52	1	10	15	7	28
Ability to use "Spectronic 20" Photocolorimeter.	22	10	9	40	53	6	15	12	3	24
Ability to use mettler analytical balance.	23	23	6	31	54	10	23	3	3	22
Ability to use hematocrit centrifuges.	24	23	11	27	55	21	22	2	1	15
Ability to use blood cell counting chambers & equipment.	25	27	11	23	56	19	24	4	1	13
Ability to use the spencer hemoglobinometer.	26	20	10	25	57	17	22	3	1	15
Ability to understand and use pulmonary function equipment.	27	3	13	44	58	0	8	17	9	27
Ability to understand physiological principles as demonstrated by use of a physiograph machine.	28	1	8	52	59	0	6	10	7	37
Know how to operate an autoclave.	29	36	11	13	60	16	28	8	0	8
Understand and operate x-ray equipment, including taking a roentgenogram.	30	15	18	28	61	7	13	12	9	15
Understand how to develop the x-ray negative.	31	24	9	28	62	13	22	2	8	16
Know the principles and uses of Axenic equipment and techniques.	32	4	5	52	63	15	13	1	0	29
Ability to operate a modern cage washing machine.	33	4	7	47	64	4	11	5	6	34
Ability to operate an animal incinerator.	34	8	13	40	65	1	5	13	14	27
Understand principles and operation of the Infrared Spectrophotometer.	35	1	8	52	66	1	6	13	4	37
Understand principles and operation of the Flame Photometer.	36	2	7	52	67	0	4	12	8	37
Understand principles and operation Gas Chromatographs.	37	2	11	48	68	1	7	10	7	36
Understand principles and operation of Paper Chromatographs	38	5	8	47	69	1	8	11	6	35
Understand principles and operation of Electrophoresis Equipment	39	2	8	51	70	0	3	14	7	37
Understand principles and operation of Ion Exchange Equipment	40	3	6	52	71	0	4	12	8	37
Ability to use pH Meters	41	17	20	24	72	4	24	7	6	20

Name ______________________

(1-10) For Coding Only

AREA I - General

APPENDIX B-2

GRAND TOTALS, CLASSES 1965-1968
Form B (N = 36)

Rating by Employer

Knowledge or Ability		Need for Training					Adequacy of Training				
		E (1)	D (2)	U (3)	W.R.		S (1)	A (2)	I (3)	DNA (4)	W.R.
Ability to accept and carry out responsibility.	11	33	3	0		31	19	15	0	1	1
Ability to get along with people.	12	27	9	0		32	23	10	0	1	2
Ability to follow directions.	13	32	4	0		33	25	9	0	1	1
Ability to assume initiative when necessary.	14	20	16	0		34	12	18	1	1	4
Ability to communicate in oral expression.	15	21	15	0		35	12	19	4	0	1
Ability to communicate in written language.	16	15	17	3	1	36	11	18	3	2	2
Ability to use technical journals and other library resources.	17	5	26	5		37	5	17	6	8	
Ability to prepare and deliver a speech.	18	4	6	25	1	38	1	8	0	23	4
Ability to keep adequate records.	19	28	8	0		39	16	18	2	0	
Ability to serve as a general receptionist.	20	13	7	16		40	9	11	0	15	1
Ability to write a technical report.	21	5	16	15		41	3	9	3	18	3
Ability to interpret technical language.	22	11	23	2		42	6	22	1	4	3
Ability to present a demonstration.	23	4	11	21		43	3	8	2	21	2
Ability to supervise other less skilled employees.	24	14	19	3		44	8	16	7	4	1
Ability to handle routine mathematical problems.	25	16	17	3		45	7	20	2	5	2
Knowledge of how our economic system operates.	26	7	14	15		46	6	11	2	14	3
Knowledge of our form of government and role of governmental regulations.	27	2	17	15	2	47	2	14	2	15	3
Knowledge of the ethical practices involved in animal technology.	28	17	13	5	1	48	12	17	0	5	2
Knowledge of laws regarding humane treatment of animals.	29	15	16	5		49	10	20	0	5	1
Ability to "grow" on the job.	30	25	11	0		50	15	18	0	2	1
Other*											

*Additional items may be added in the blank spaces provided.

APPENDIX B-2 (continued)

Name ____________________

(1-10) For Coding Only __ __ __ __ __ __ __ __ __ __

AREA II - Anatomy, Physiology and Histology

Rating by Employer

Knowledge or Ability		Need for Training E (1)	D (2)	U (3)	W.R.		Adequacy of Training S (1)	A (2)	I (3)	DNA (4)	W.R.
Knowledge of the definitions, descriptive terms, and other language of the field.	11	14	17	4	1	28	5	24	3	4	
Knowledge of microscopic and gross anatomy.	12	8	21	6	1	29	6	19	5	5	1
Knowledge of the anatomy of the muscular system.	13	6	17	10	3	30	1	21	0	10	4
Knowledge of the physiology of the muscular system.	14	5	16	12	3	31	0	18	3	11	4
Knowledge of the anatomy of the digestive system.	15	6	23	4	3	32	1	23	2	6	4
Knowledge of the physiology of the digestive system.	16	6	21	6	3	33	1	20	3	8	4
Knowledge of the anatomy of the respiratory system.	17	6	22	5	3	34	1	23	1	7	4
Knowledge of the physiology of the respiratory system.	18	6	21	5	4	35	1	20	3	7	5
Knowledge of the anatomy of the urogenital system.	19	6	22	5	3	36	0	22	3	7	4
Knowledge of the physiology of the urogenital system.	20	5	22	6	3	37	0	21	3	8	4
Knowledge of the anatomy of the endocrine system.	21	4	19	10	3	38	0	20	3	9	4
Knowledge of the physiology of the endocrine system.	22	5	20	8	3	39	0	20	3	9	4
Knowledge of the anatomy of the circulatory system.	23	9	19	5	3	40	3	20	2	7	4
Knowledge of the physiology of the circulatory system.	24	8	19	6	3	41	0	20	3	9	4
Knowledge of the anatomy of the nervous system.	25	7	17	9	3	42	3	20	2	7	4
Knowledge of the physiology of the nervous system.	26	5	17	11	3	43	0	19	3	10	4
Knowledge of the applications of anatomy and physiology	27	8	19	6	3	44	1	20	3	7	5
Other*											

Name ______________________________ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ (1-10) For Coding Only

APPENDIX B-2
GRAND TOTALS, CLASSES 1965-1968

AREA III - Animal Care and Nutrition   Form B (N = 36)   Rating by Employer

Knowledge or Ability		Need for Training					Adequacy of Training				
		E (1)	D (2)	U (3)	WR		S (1)	A (2)	I (3)	DNA (4)	WR
Knowledge of general livestock production.	11	2	12	21	1	38	4	9	0	20	3
Knowledge of specific livestock classes - dairy cattle, swine, sheep, horses and poultry.	12	1	9	25	1	39	3	8	0	22	3
Knowledge of other domesticated animals including laboratory animals.	13	7	19	10		40	6	18	0	12	
To understand the general principles of nutrition.	14	8	21	7		41	3	24	2	7	
To understand the nutritive needs of animals of different classes.	15	7	11	18		42	1	13	2	19	1
To understand how different classes of animals utilize various feeds.	16	4	10	21	1	43	1	10	2	21	2
To understand the process of digestion and absorption of feed by animals.	17	3	13	19	1	44	1	12	3	18	2
To be able to interpret feed analysis reports.	18	0	7	28	1	45	0	5	2	27	2
To be able to figure TDN, nutritive ratio, and net energy of feeds.	19	0	2	33	1	46	0	3	0	30	3
To know the mineral needs of animals.	20	3	7	25	1	47	0	7	2	24	3
To know the vitamin needs of animals.	21	3	8	24	1	48	0	10	2	21	3
To be able to care for, including caging, bedding, and feeding of animals.	22	16	11	9		49	11	15	0	10	
To be able to apply methods of restraint to animals.	23	21	9	6		50	10	18	2	6	
To know the factors involved in humane treatment of animals.	24	23	10	3		51	14	20	0	2	
To be able to apply an adequate sanitation program to various animals.	25	19	10	7		52	10	15	1	10	
To be able to administer or assist in administering anesthesia to animals.	26	23	9	4		53	10	17	5	4	
To know and understand the reasons for euthanasia in animals.	27	20	12	4		54	11	20	1	4	
To understand the legal requirements regarding animals used in research.	28	9	15	11	1	55	4	17	0	13	2
To be able to identify symptoms of ill-health.	29	22	11	3		56	9	20	3	4	
To be able to organize a breeding program for laboratory animals.	30	1	5	28	2	57	1	5	0	27	3
To be able to collect specimens of blood.	31	16	15	5		58	7	18	6	5	
To know proper autopsy and disposal methods.	32	9	19	8		59	6	17	4	9	
To understand and care for gnotobiote animals.	33	2	5	24	5	60	1	5	1	23	6
To know how to handle and care for axenic animals.	34	3	4	24	5	61	3	4	0	23	
Understand the principles of heredity.	35	3	16	16	1	62	1	14	1	17	3
Knowledge of the problems caused by heredity variation.	36	2	13	18	3	63	1	13	1	16	5
Other*	37	2	13	18	3	64	1	13	1	16	5

Name ______________________________ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ (1-10) For Coding Only

APPENDIX B-2

GRAND TOTALS, CLASSES 1965-1968

AREA IV - Parasitology, Hematology, Pathology and Food Inspection

Form B (N = 36)

Rating by Employer

Knowledge or Ability		Need for Training E (1)	Need for Training D (2)	Need for Training U (3)	WR		Adequacy of Training S (1)	Adequacy of Training A (2)	Adequacy of Training I (3)	Adequacy of Training DNA (4)	WR
Understand the nature of micro-organisms as they relate to human endeavor.	11	12	19	5		26	3	25	0	8	
Knowledge of basic principles involved in classifying and identifying the common micro-organisms.	12	7	15	14		27	3	16	2	14	1
Knowledge of disease transmission.	13	17	13	5	1	28	7	23	0	4	2
Knowledge of the diseases of animals that are hazardous to human health.	14	20	11	5		29	7	18	4	6	1
Ability to understand methods, procedures and records used in animal research.	15	10	10	15	1	30	7	13	0	14	2
To be able to perform basic hematological procedures.	16	22	9	5		31	11	13	7	5	
Ability to examine animal cell structure.	17	4	10	21	1	32	2	8	6	17	3
Ability to prepare animal tissue for examination.	18	9	10	16	1	33	4	10	4	16	2
Knowledge of the life cycles of common animal parasites.	19	11	18	6	1	34	5	22	1	7	1
Ability to identify internal and external parasites in animals.	20	13	15	5	3	35	6	18	3	6	3
Knowledge of food inspection enforcement procedures.	21	3	5	27	1	36	1	8	0	23	4
Understand the relationship of inspection to public health.	22	3	9	23	1	37	1	11	0	20	4
Understand the principles of food plant sanitation.	23	2	7	26	1	38	1	9	0	22	4
Ability to interpret and use farm and plant inspection reports.	24	3	3	29	1	39	1	6	0	25	4
Ability to use microscopic plate methods for bacterial analysis	25	8	17	11		40	5	16	3	12	

Name ______________________________ For Coding Only

APPENDIX B-2

GRAND TOTALS, CLASSES 1965-1968

AREA V - Scientific Instrumentation and Laboratory Equipment

Form B (N = 36)

Knowledge or Ability		Need for Training E (1)	D (2)	U (3)	WR		Adequacy of Training S (1)	A (2)	I (3)	DNA (4)	WR
Knowledge of ethaire anesthetic machine.	11	8	12	15	1	42	1	12	3	16	4
Knowledge of electro-anesthesia equipment.	12	4	6	25	1	43	1	5	0	15	15
Knowledge of multiple inhalant anesthetic machine.	13	10	9	16	1	44	1	5	8	19	3
Ability to operate electric sterilizer.	14	20	11	5		45	10	11	3	10	2
Ability to use pre-surgical preparation equipment.	15	21	9	6		46	12	17	1	6	
Ability to use oxygen equipment for emergency purposes.	16	18	8	9	1	47	10	13	3	8	2
Know complete operation and cycles of autotechnicon.	17	12	3	19	2	48	4	7	2	15	8
Understand principles and operation of lyophylizing apparatus.	18	5	4	27		49	3	3	1	24	5
Understand principles and operation of F. A. scopes.	19	1	7	25	3	50	1	4	2	23	6
Understand operation of microtome and accessory equipment.	20	5	2	27	2	51	3	4	1	22	6
Understand principles and operation of Coulter Particle counter.	21	4	3	26	3	52	2	5	4	19	6
Ability to use "Spectronic 20" Photocolorimeter.	22	8	5	20	3	53	3	9	0	20	4
Ability to use mettler analytical balance.	23	12	3	19	2	54	6	7	3	16	4
Ability to use hematocrit centrifuges.	24	17	9	9	1	55	8	15	3	9	1
Ability to use blood cell counting chambers & equipment.	25	19	9	8		56	8	16	4	8	
Ability to use the spencer hemoglobinometer.	26	8	6	19	3	57	3	9	1	18	5
Ability to understand and use pulmonary function equipment.	27	3	7	25	1	58	1	5	3	23	4
Ability to understand physiological principles as demonstrated by use of a physiograph machine.	28	1	6	26	3	59	2	2	2	23	7
Know how to operate an autoclave.	29	22	9	4	1	60	14	15	3	4	
Understand and operate x-ray equipment, including taking a roentgenogram.	30	12	9	11	4	61	5	11	6	10	4
Understand how to develop the x-ray negative.	31	15	7	12	2	62	9	11	3	10	3
Know the principles and uses of Axenic equipment and techniques.	32	2	1	29	4	63	2	1	1	25	7
Ability to operate a modern cage washing machine.	33	6	7	23		64	2	6	0	22	6
Ability to operate an animal incinerator.	34	7	9	20		65	4	9	1	17	5
Understand principles and operation of the Infrared Spectrophotometer.	35	1	7	28		66	2	4	3	22	5
Understand principles and operation of the Flame Photometer	36	2	5	28	1	67	2	2	2	24	6
Understand principles and operation of Gas Chromatographs.	37	1	4	30	1	68	2	2	2	24	6
Understand principles and operation of Paper Chromatographs	38	1	7	27	1	69	1	5	2	22	6
Understand principles and operation of Electrophoresis equipment.	39	1	7	28		70	2	2	3	23	6
Understand principles and operation of Ion Exchange Equipment.	40	2	5	29		71	2	3	2	23	6
Ability to use pH Meters.	41	4	15	14	3	72	4	13	3	10	6

Name ______________________

APPENDIX B-3

______ (1-7) For Coding Only

AREA I - General

GRAND TOTALS, CLASSES 1965-1968
Form A-1 (N = 37)

Knowledge or Ability		Rating by Graduates Pursuing Further Education			
		S (1)	A (2)	I (3)	B (4)
Ability to accept and carry out responsibility.	20	16	20	0	1
Ability to get along with people.	21	20	15	1	1
Ability to follow directions.	22	15	21	0	0
Ability to assume initiative when necessary.	23	17	19	1	0
Ability to communicate in oral expression.	24	11	17	6	3
Ability to communicate in written language	25	8	19	9	1
Ability to use technical journals and other library resources.	26	9	21	7	0
Ability to prepare and deliver a speech.	27	6	17	12	0
Ability to keep adequate records.	28	11	19	5	2
Ability to serve as a general receptionist.	29	6	12	11	8
Ability to handle telephone requests for information	30	5	15	9	6
Ability to interpret technical language.	31	19	17	0	1
Ability to present a demonstration.	32	15	17	3	2
Ability to supervise other less skilled employees	33	10	19	5	3
Ability to handle routine mathematical problems.	34	5	23	7	2
Knowledge of how our economic system operates.	35	7	18	6	5
Knowledge of our form of government and role of governmental regulations.	36	9	18	2	7
Knowledge of the ethical practices involved in animal technology.	37	21	10	1	5
Knowledge of laws regarding humane treatment of animals.	38	21	10	0	6
Ability to "grow" on the job	39	17	16	0	4
Other*					

*Additional items may be added in the blank spaces provided.

Name ____________________

APPENDIX B-3

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(1-7) For Coding Only

AREA II - Anatomy, Physiology and Histology

GRAND TOTALS, CLASSES OF 1965-68

Form A-1 (N = 37)

Knowledge or Ability		Rating by Graduates Pursuing Further Education			
		S (1)	A (2)	I (3)	B (4)
Knowledge of the definitions, descriptive terms, and other language of the field	8	25	7	0	1
Knowledge of microscopic and gross anatomy.	9	18	16	0	3
Knowledge of the anatomy of the muscular system.	10	14	18	0	5
Knowledge of the physiology of the muscular system.	11	16	14	3	4
Knowledge of the anatomy of the digestive system.	12	17	16	1	3
Knowledge of the physiology of the digestive system.	13	16	16	2	3
Knowledge of the anatomy of the respiratory system	14	14	19	1	3
Knowledge of the physiology of the respiratory system.	15	14	17	3	3
Knowledge of the anatomy of the urogenital system.	16	12	18	4	3
Knowledge of the physiology of the urogenital system.	17	12	17	5	3
Knowledge of the anatomy of the endocrine system.	18	11	16	5	5
Knowledge of the physiology of the endocrine system.	19	11	15	6	5
Knowledge of the anatomy of the circulatory system.	20	15	16	3	3
Knowledge of the physiology of the circulatory system.	21	18	12	4	3
Knowledge of the anatomy of the nervous system.	22	8	19	6	3
Knowledge of the physiology of the nervous system.	23	12	13	8	4
Knowledge of the applications of anatomy and physiology.	24	15	15	4	3
Other*					

Name ______________________________

(1-7) For Coding Only

APPENDIX B-3

AREA III - Animal Care and Nutrition

GRAND TOTALS, CLASSES OF 1965-68
Form A-1 (N = 37)

Knowledge or Ability		Rating by Graduates Pursuing Further Education			
		S (1)	A (2)	I (3)	B (4)
Knowledge of general livestock production.	25	9	15	1	12
Knowledge of specific livestock classes - dairy cattle, swine, sheep, horses and poultry.	26	11	9	3	14
Knowledge of other domesticated animals including laboratory animals.	27	24	9	0	4
To understand the general principles of nutrition.	28	10	19	4	4
To understand the nutritive needs of animals of different classes.	29	8	16	6	7
To understand how different classes of animals utilize various feeds	30	8	14	8	7
To understand the process of digestion and absorption of feed by animals.	31	17	9	4	7
To be able to interpret feed analysis reports.	32	7	10	11	9
To be able to figure TDN, nutritive ratio, and net energy of feeds.	33	14	11	2	10
To know the mineral needs of animals.	34	17	10	4	6
To know the vitamin needs of animals.	35	17	10	4	6
To be able to care for, including caging, bedding, and feeding of animals.	36	26	6	0	5
To be able to apply methods of restraint to animals.	37	14	15	4	4
To know the factors involved in humane treatment of animals.	38	24	8	0	5
To be able to apply an adequate sanitation program to various animals.	39	22	10	1	4
To be able to administer or assist in administering anesthesia to animals.	40	18	13	1	5
To know and understand the reasons for euthanasia in animals.	41	21	8	2	6
To understand the legal requirements regarding animals used in research.	42	17	15	0	5
To be able to identify symptoms of ill-health.	43	14	19	2	2
To be able to organize a breeding program for laboratory animals.	44	14	12	3	8
To be able to collect specimens of blood.	45	24	8	3	2
To know proper autopsy and disposal methods.	46	17	14	2	4
To understand and care for gnotobiote animals.	47	20	5	6	6
To know how to handle and care for axenic animals.	48	22	7	2	6
Understand the principles of heredity.	49	13	14	8	2
Knowledge of the problems caused by heredity variation.	50	14	13	8	2
*Other					

Name ______________________________

APPENDIX B-3

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(1-7) For Coding Only

GRAND TOTALS, CLASSES OF 1965-68

AREA IV - Parasitology, Hematology, Pathology and Food Inspection

Form A-1 (N = 37)

Knowledge or Ability		Rating by Graduates Pursuing Further Education S (1)	A (2)	I (3)	B (4)
Understand the nature of micro-organisms as they relate to human behavior.	8	17	16	2	2
Knowledge of basic principles involved in classifying and identifying the common micro-organisms.	9	18	14	2	3
Knowledge of disease transmission.	10	23	12	0	2
Knowledge of the diseases of animals that are hazardous to human health.	11	21	14	0	2
Ability to understand methods, procedures and records used in animal research.	12	12	18	3	4
To be able to perform basic hematological procedures.	13	20	12	2	3
Ability to examine animal cell structure.	14	15	17	2	3
Ability to prepare animal tissue for examination.	15	19	11	3	3
Knowledge of the life cycles of common animal parasites.	16	15	16	1	5
Ability to identify internal and external parasites in animals	17	15	17	1	4
Knowledge of food inspection enforcement procedures.	18	11	18	2	5
Understand the relationship of inspection to public health.	19	14	15	2	5
Understand the principles of food plant sanitation.	20	12	15	2	7
Ability to interpret and use farm and plant inspection reports.	21	8	9	8	11
Ability to use microscopic plate methods for bacterial analysis.	22	21	9	3	3

Name ______________________

APPENDIX B-3

GRAND TOTALS, CLASSES OF 1965-68

___ ___ ___ ___ ___ ___ ___ (1-7) For Coding Only

AREA V - Scientific Instrumentation and Laboratory Equipment

Form A-1 (N = 37)

Knowledge or Ability		Rating by Graduates Pursuing Further Education S (1)	A (2)	I (3)	B (4)
Knowledge of ethaire anesthetic machine	23	10	14	7	6
Knowledge of electro-anesthesia equipment.	24	4	9	18	6
Knowledge of multiple inhalant anesthetic machine.	25	6	9	14	7
Ability to operate electric sterilizer.	26	11	16	7	3
Ability to use pre-surgical preparation equipment.	27	17	12	2	5
Ability to use oxygen equipment for emergency purposes.	28	8	8	18	3
Know complete operation and cycles of autotechnicon.	29	12	9	10	4
Understand principles and operation of lyophylizing apparatus.	30	6	8	19	4
Understand principles and operation of F. A. Scopes	31	8	8	17	4
Understand operation of microtome and accessory equipment.	32	11	6	16	3
Understand principles and operation of Coulter Particle counter	33	4	8	21	4
Ability to use "Spectronic 20" Photocolorimeter.	34	8	14	10	4
Ability to use mettler analytical balance.	35	18	14	1	4
Ability to use hematocrit centrifuges.	36	23	9	1	4
Ability to use blood cell counting chambers and equipment.	37	25	10	0	2
Ability to use the spencer hemoglobinometer.	38	22	10	2	3
Ability to understand and use pulmonary function equipment.	39	1	11	19	4
Ability to understand physiological principles as demonstrated by use of a physiograph machine.	40	6	7	20	3
Know how to operate an autoclave.	41	17	13	5	2
Understand and operate x-ray equipment, including making a roentgenogram.	42	14	11	9	3
Understand how to develop the x-ray negative.	43	16	9	10	2
Know the principles and uses of Axenic equipment and techniques.	44	22	5	4	6
Ability to operate a modern cage washing machine.	45	13	8	9	7
Ability to operate an animal incinerator.	46	2	11	19	4
Understand principles and operation of the Infrared Spectrophotometer.	47	4	8	18	4
Understand principles and operation of the Flame Photometer.	48	3	2	25	4
Understand principles and operation of Gas Chromatographs.	49	4	8	20	4
Understand principles and operation of Paper Chromatographs.	50	4	11	17	4
Understand principles and operation of Electrophoresis equipment	51	2	9	21	3
Understand principles and operation of Ion Exchange Equipment	52	3	9	21	2
Ability to use pH Meters.	53	9	16	9	3

APPENDIX C

PRIMARY ITEMS OF LABORATORY AND AUDIO-VISUAL EQUIPMENT UTILIZED FOR INSTRUCTIONAL PURPOSES IN THE ANIMAL SCIENCE TECHNOLOGY PROGRAM

A. Procured through United States Office of Education

Animal Science Developmental Contract No. OE-5-85-076:

Quantity	Item	Unit Cost*
1	Autoclave, high vacuum type and steam generator 20x20x36	$ 7,300.00
1	Balance, analytical	616.00
1	Blender, Waring	34.95
10	Cages, dog and cat	244.82
300	Cage units, rodent, plastic with metal lids	4.21
1	Camera, 35mm	140.00
1	Camera, 16mm	250.00
1	Cell counter, Coulter	3,580.00
1	Centrifuge, refrigerated	2,161.60
1	Cryoscope, advanced	1,567.50
1	Desk, instructor's	666.15
1	Filter unit, Millipore	811.00
1	Graphs, thermo-hygro recording	585.00
1	Incubator, bacterial	510.40
1	Scale, mouse weighing, 100 gram capacity, Pennograph	322.00
1	Scale, rodent weighing, 2500 gram capacity, Toledo	498.65
1	Sink, utility	152.50
1	Truck, animal cage type	749.76

Quantity	Item	Unit Cost*
1	Washer, animal cage type	$ 4,158.00
1	Washer, pipette	105.00
1	Washer, test tube	249.00
1	Water bath, serological	115.00
1	X-ray unit, complete, 200 MA 125 KVP generator complete with 1/60 second high speed timer and heavy duty contactor	9,238.00

* Equipment cost information reflects 1965-1969 prices.

B. Procured through other Federal or State-Federal matching equipment grants:

Quantity	Item	Unit Cost*
1	Analyzer, prothrombin, Endico	$ 430.00
2	Anesthesia unit, electro-	789.60
1	Anesthesia unit, inhalation type	395.00
	Autotechnicon accessories (various)	449.10
1	Balance, P-3, Mettler	600.00
1	Balance, analytical, Mettler	670.00
1	Balance, moisture, Cenco	250.00
1	Balance, analytical H6T	612.00
3	Baths, tissue flotation	30.00
1	Bath, animal (surgical scrub)	250.00
1	Blender, stirrer, Waring	74.95
1	Blender, Waring	34.95
2	Buckets, kick, surgical type	24.10
50	Burners, Bunsen, gas type	7.00

Quantity	Item	Unit Cost*
2	Cabinets, drug and supply type	$ 185.00
3	Cabinets, slide storage	74.00
100	Cages, rodent type, plastic with metal lids	5.70
1	Cage unit, rabbit	900.00
1	Cage, oxygen therapy	252.00
1	Cage unit, guinea pig	259.25
1	Cage truck, guinea pig	468.00
1	Camera, 35mm, and camera pack	199.50
1	Camera, 35mm, Pentex Spotomatic, with microscope adapter	360.00
1	Camera, Polaroid, industrial	885.00
2	Carts, utility	74.80
1	Cavitron (dental cleaning instrument)	769.00
5	Cell counter, differential	85.00
1	Centrifuge, clinical	256.80
2	Centrifuge, clinical, 6 tube (IEC 458)	169.00
2	Centrifuge, clinical, horizontal heads, C1960	37.60
1	Centrifuge, Model K	810.40
2	Centrifuge, hematocrit	133.00
2	Clippers, small animal	44.67
1	Colorimeter	436.60
66	Counters, differential	20.00
1	Crematory, animal	1,650.00
2	Dispenser, soap, foot pedal	42.50
1	Electro-phoresis apparatus	520.00

Quantity	Item	Unit Cost*
1	Electro-surgical instrument Birtcher Blendtome	$ 450.00
3	Feed bins, mobile	125.50
1	Filing system, Tissue-Tek	249.00
1	Freezer, shell, automatic	1,182.00
	Furniture, prep room (cabinets and tables)	420.00
	Furniture, laboratory	11,142.40
1	Generator, steam (cleaning jenny)	425.95
1	Gun, animal tranquilizer	234.55
5	Hemoglobinometers	651.16
2	Immobilizers, rabbit	128.75
1	Incubator	995.00
1	Incubator, egg (laboratory)	175.00
	Instruments, surgical (various)	1,316.65
12	Isolators, axenic and accessory equipment	361.85
1	Lamp, arc type, mercury	45.00
1	Lamp, ultra violet (Woods diagnostic)	24.75
2	Lights, surgical operating	237.50
1	Light, operating, portable	79.50
1	Lypholizing machine	1,724.20
1	Metabolism apparatus, Benedict-Roth	425.00
1	Metal detector, transistor	272.00
2	Microscope, fluorescent	1,190.00
1	Microscope, dissecting	452.00
43	Microscope, monocular (student)	350.00

Quantity	Item	Unit Cost*
1	Microscope, phase type	$ 1,577.68
3	Microscope, trinocular with viewing screen	763.50
1	Microscope, trinocular	763.50
1	Microscope, stereo zoom	599.40
5	Microtomes, rotary precision	774.00
3	Microtomes	705.00
2	Microtome blade sharpener	545.00
1	Microtome crystatat, Lab Tek	1,875.00
1	Mimeograph machine and cabinet	856.00
2	Multiple dialyzer	150.00
1	pH meter, Beckman	330.00
2	pH meter assembly, blood	650.00
1	pH meter, Coleman	325.00
1	Photocopy machine, 3M, Model 107	330.00
1	Physiograph "6"	4,988.50
1	Post mortem kit	49.50
1	Projector, micro slide	413.30
2	Projector, carousel type, slide	125.00
1	Projector, movie, Bell & Howell	525.00
1	Projector, slide, Kodak Karasel	135.00
6	Racks, staining	43.00
4	Refrigerator	137.17
1	Refrigerator, biological	199.50
1	Safe, narcotic, lock type	33.60
2	Saw, autopsy, Stryker	153.00
1	Scales, Todedo 1070	498.65

Quantity	Item	Unit Cost*
2	Screen, overhead projection, Radiant	$ 49.95
5	Shaker, serological	156.00
5	Shaker, pipette (4 pipettes)	73.50
2	Sharpener, microtome knife	215.25
2	Sink, utility and surgeon	434.95
1	Skeletons, chimpanzee	450.00
8	Skeletons, dogs	87.00
1498	Slides	1.00
5	Staining set, histological, with racks	157.50
1	Stand, oxygen bottle, rollabout	20.00
2	Stand, instrument	103.50
2	Stirrer, magnetic, hot plate	110.00
5	Surgical equipment, rodent endocrinectomy type	300.00
1	Table, autopsy	965.00
3	Table, operating	1,348.00
3	Tattoo machine,	33.5
1	Tele-thermometer	135.00
1	Television camera	1,297.25
1	Television monitor	430.00
1	Tester, vacuum	14.00
3	Thermo-electric center, air cooled (paraffin embedding) Lab Tek	645.00
4	Timers, interval	47.00
500	Tubes, animal drinking	.30
2	Unitest equipment, urine and blood	625.00
1	Vacuums, wet and dry	510.00

Quantity	Item	Unit Cost*
5	Warmer, microscope slide	$ 54.00
1	Washer, laboratory glassware	1,600.00
1	Washer, test tube	225.00
1	Washer-dryer, automatic (clothes)	352.25
1	Washer-dryer, pipette	105.00
1	Washer, electric, bottle	300.00
2	Waste bins, mobile	71.25
5	Water bath, slide dryers, Lab Tek	123.50
5	Water bath, slide dryers	67.93
2	Water bath, serological	195.00
1	Water bath, Majonnier	60.00
1	Water distiller	990.00
	X-ray equipment (cassettes, protective aprons, protective gloves)	722.20
1	X-ray, portable unit	1,783.00
	X-ray, accessories (various)	1,947.78

* Equipment cost information reflects 1965-1969 prices.

APPENDIX D

SELECTED LIST OF PROFESSIONAL AND TECHNICAL SOCIETIES AND ORGANIZATIONS CONCERNED WITH LABORATORY ANIMAL AND VETERINARY ASSISTING TECHNOLOGY

A list of some professional and technical societies and associations concerned with laboratory animal and veterinary assisting technology can be a source of useful instructional information and reference data. The selected list which follows is not a complete listing; inclusion does not imply special approval; omission does not imply disapproval of an organization. Details regarding local chapters or sections have been omitted. Educators desiring information from the organizations may address inquiries to the executive secretary at the address shown.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,
1515 Massachusetts Avenue, N.W., Washington, D. C.

Purpose: The largest general scientific organization representing all fields of science. Membership includes scientific societies, professional organizations and state and city academies. Sections of this organization relevant to animal science include: zoological sciences, medical sciences, pharmaceutical sciences, agriculture, industrial science, education and statistics.

Publications: Science, weekly; Symposium Volumes; Science Education News, quarterly; AAAS Bulletin, quarterly; Understanding, quarterly.

AMERICAN ASSOCIATION FOR CONTAMINATION CONTROL, P. O. Box 2264, Sandusky, Ohio

Purpose: Contamination control involving, in part, representatives of pharmaceutical, medical and biological sciences, managers of hospitals, educators and students, with interest in that field.

Publication: Journal of the A.A.C.C., monthly.

AMERICAN ASSOCIATION OF EQUINE PRACTITIONERS, Route 3, 14 Hillcrest Circle, Golden, Colorado

Purpose: For veterinarians. To disseminate latest scientific information relative to the practice of equine medicine; to promote research on horses.

Publications: None.

AMERICAN ASSOCIATION FOR LABORATORY ANIMAL SCIENCE, P. O. Box 1028, Joliet Illinois

Purpose: Biomedical researchers, physicians, veterinarians, animal technicians, commercial animal breeders and others professionally engaged in the breeding, care and use of laboratory animals.

Publications: Laboratory Animal Care, bi-monthly.

AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 Broadway, New York, New York

Purpose: Promulgation of standards, establishment of uniform practices and procedures, development of evaluation and appraisal processes, tabulation of important facts on the etiology of communicable diseases, creation of testing methods for selection of professional public health workers, establishment of desirable minimum educational qualifications, sponsoring accreditation of schools of public health, research in many areas of public health, exploration of various types of medical care programs and their relationship to public health.

Publications: American Journal of Public Health, monthly.

AMERICAN ASSOCIATION OF VETERINARY NUTRITIONISTS, 108 South Dixie Highway, Cridersville, Ohio

Purpose: To promote research in fields where health of animals may be influenced by nutrition.

Publications: None

AMERICAN ASSOCIATION OF VETERINARY PARASITOLOGISTS, Box 847, Kissimee, Florida

Purpose: Veterinarians actively engaged in teaching and research in parasitology. Encourages education and research in the field; provides for exchange of information.

Publications: None.

AMERICAN COLLEGE FOR LABORATORY ANIMAL MEDICINE, Institute for Laboratory Animal Resources, 2101 Constitution Avenue, Washington, D. C. 20418

Purpose: For veterinarians specializing in laboratory animal medicine. Establishes standards of training and experiences for qualification of specialists in the field, administers examinations, and certifies eligible specialists. Encourages education, training and research in laboratory animal medicine.

Publications: None.

AMERICAN COLLEGE OF VETERINARY PATHOLOGISTS, Veterinary Pathology Building, 1925 Coffey Road, Columbus, Ohio

Purpose: Professional society of specialists in veterinary pathology (origin, nature and course of disease in animals). Recognized as the certifying agency for the specialty of veterinary pathology in the United States and Canada.

Publications: None.

AMERICAN DAIRY ASSOCIATION, 20 North Wacker Drive, Chicago, Illinois

Purpose: A federation of 44 regional and state dairy farmers associations. Conducts advertising, merchandising, public relations, and research program for all dairy foods, on a non-brand basis.

Publications: Dairy Promotion Topics,bi-monthly.

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, 2000 P Street, N.W., Washington, D. C.

Purpose: Federation of professional biological associations and individuals with an interest in the life sciences. To promote unity and effectiveness of effort among persons engaged in biological research, teaching or application of biological data; to further the relationships of biological sciences to other sciences, the arts and industries.

Publications: AIBS Bulletin, bi-monthly; Review of Biology, quarterly; In Brief...In Biology, five times annually; Symposia Proceedings.

AMERICAN MEAT INSTITUTE FOUNDATION, 939 East 57th Street, Chicago, Illinois

Purpose: Scientific research and educational institution, affiliated with the University of Chicago. Engages exclusively in research related to production of livestock and processing and utilization of products derived from livestock.

Publications: AMIF Bulletins, irregular; Circulars, irregular.

AMERICAN SOCIETY OF ANIMAL SCIENCE, c/o Q Corporation, 39 Sheridan Avenue, Albany, New York 12210

Purpose: Professional society of persons engaged in investigation, instruction or extension in animal science, or in the production of livestock products.

Publications: Journal of Animal Science, quarterly.

AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS, Hermann Professional Building, Suite 25, Houston, Texas

Purpose: Primarily medical technologists who have been certified by Registry of Medical Technologists of the American Society of Clinical Pathologists, and specialists who hold at least a master's degree in one of the major fields of medical technology, such as specialists with limited certificates, and students enrolled in medical technology schools. Seeks to promote and maintain high standards in clinical laboratory methods and research, and to advance standards of education and training.

Publications: American Journal of Medical Technology, bi-monthly; ASMT News Release, bi-monthly; Party Line, bi-monthly; Teaching Tech, bi-monthly; Library Bulletin, three per year; ASMT Directory, irregular.

AMERICAN SOCIETY FOR MICROBIOLOGY, 115 Huron View Boulevard,
Ann Arbor, Michigan

Purpose: Scientific society of microbiologists. Bacterial physiology; medical; agricultural; virology; industrial.

Publications: Journal of Bacteriology, monthly; Applied Microbiology, bi-monthly; Bacteriological Reviews, quarterly; Bacteriological Proceedings, annual; Antimicrobial Agents and Chemotherapy, annual.

AMERICAN SOCIETY OF PARASITOLOGISTS, Zoology Department,
University of Illinois, Urbana, Illinois

Purpose: Professional society of persons interested in improving the teaching and promoting the study of parasites and related sciences.

Publications: Journal of Parasitology, bi-monthly.

AMERICAN SOCIETY FOR PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS,
9650 Wisconsin Avenue, Washington, D. C.

Purpose: Scientific society of investigators in pharmacology and toxicology interested in research and promotion of pharmacological knowledge and its use among scientists.

Publications: Journal of Pharmacology and Experimental Therapeutics, monthly; Pharmacological Reviews, quarterly; Pharmacologist, semi-annual.

AMERICAN SADDLE HORSE BREEDERS ASSOCIATION, 929 South Fourth
Street, Louisville, Kentucky

Purpose: Breeders of American saddle bred horses throughout the world. Maintains registry and pedigree records.

Publications: None.

AMERICAN ANIMAL HOSPITAL ASSOCIATION, 3920 East Jackson Boulevard, Elkhart, Indiana

Purpose: Veterinarians engaged in small animal practice who own small animal hospitals. For the improvement of animal hospital facilities.

Publications: AAHA Bulletin, bi-monthly.

AMERICAN VETERINARY MEDICAL ASSOCIATION, 600 South Michigan Avenue, Chicago, Illinois

Purpose: Professional society of veterinarians. Councils: judicial, education, research, biological and therapeutic agents, public health and regulatory veterinary medicine, and veterinary service. Sections: research, small animals, poultry, and public health.

Publications: Journal of AVMA, semi-monthly; American Journal of Veterinary Research, bi-monthly.

AMERICAN VETERINARY RADIOLOGY SOCIETY, 600 South Michigan Avenue Chicago, Illinois

Purpose: Veterinarians in practice, teaching or research interested in veterinary radiology.

Publications: Journal of the American Veterinary Radiology Society.

ANIMAL HEALTH INSTITUTE, 512 Shops Building, Des Moines, Iowa

Purpose: Organization of manufacturers of antibiotics, drugs and chemicals used in animal health and nutritional products. Special committees: food additives, law, pharmaceutical products, research and scientific advisory.

Publications: AHI News Bulletin, monthly.

ANIMAL MEDICAL CENTER, 62nd Street and East River Drive, New York, New York

Purpose: To conduct research into the nature of animal disease for the benefit of both animal and human health; to provide the best possible treatment for sick animals; to education veterinarians in specialty of small animal medicine and in comparative medical research and dissemination of knowledge.

Publications: None.

ANIMAL NUTRITION RESEARCH COUNCIL, Monsanto Chemical Company, 800 North Lindbergh Street, St. Louis, Missouri

Purpose: Conducts research on animal feeds. To stimulate research in animal nutrition and promote collaborative studies of assay methods for nutritional factors.

Publications: ANRC Newsletter; semi-annual.

ANIMAL TECHNICIANS ASSOCIATION, Medical Research Council, Mill Hill, London, England

Purpose: Professional improvement and education of the laboratory animal technician.

Publications: Journal of the Animal Technicians Association; semi-monthly.

ANIMAL WELFARE INSTITUTE, 22 East 17th Street, New York, New York

Purpose: To promote humane treatment of animals, particularly animals used in research and medicine.

Publications: Information Report, bi-monthly. Manuals are also published for special topics, these include: Comfortable Quarters for Laboratory Animals, Basic Care of Experimental Animals, First Aid and Care of Small Animals (for primary teachers) and Humane Biology Projects (for secondary teachers).

ASSOCIATION FOR GNOTOBIOTICS, 1630 Latham Drive, Madison, Wisconsin

Purpose: Biological, medical and veterinary scientists and technicians interested and involved in research and/or development using germfree animals and equipment.

Publications: AFG Newsletter; periodic.

ASSOCIATION OF AMERICAN BOARDS OF EXAMINERS IN VETERINARY MEDICINE, 1680 Teaneck Road, Teaneck, New Jersey

Purpose: To improve methods of examining candidates for licensure, to elevate standards of proficiency; to exchange information on enforcement of practice acts; to prepare a uniform minimum of standards for practice and licensure.

Publications: None

ASSOCIATION OF STATE PUBLIC HEALTH VETERINARIANS, Tennessee Department of Public Health, Nashville, Tennessee

Purpose: Executive veterinary public health administrators in each state. To guide and develop veterinary public health programs on the state and national levels.

Publications: None.

CONFERENCE OF BIOLOGICAL EDITORS, Department of Biology, University of Notre Dame, Notre Dame, Indiana

Purpose: Active and former editors of primary and secondary journals in the biological sciences, through study groups, panels and committees, investigates all aspects of biological communication with emphasis on publication, especially publication in primary journals and retrieval in secondary media.

Publications: Newsletter; irregular. Also publishes Style Manual for Biological Journals, in conjunction with American Institute of Biological Sciences.

CONFERENCE OF PUBLIC HEALTH VETERINARIANS, 2 East 63rd Street, New York, New York

Purpose: Professional society of veterinarians interested in public health, education and scientific progress in veterinary public health; to encourage educational training and research and the exchange of scientific information.

Publications: None

CONFERENCE OF RESEARCH WORKERS IN ANIMAL DISEASES, 200 First Street, S.W., Rochester, Minnesota

Purpose: Research workers in animal diseases employed by governmental or endowed institutions.

Publications: None.

FEDERATION OF AMERICAN SOCIETY FOR EXPERIMENTAL BIOLOGY, 9650 Wisconsin Avenue, Washington, D. C.

Purpose: Federation of six scientific societies; American Physiological Society; American Society of Biological Chemists; American Society for Pharmacology and Experimental Therapeutics; American Institute of Nutrition; American Society for Experimental Pathology; American Association of Immunologists.

Publications: Federation Proceedings; quarterly.

INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, P. O. Box 437, Blue Ridge Road, Shelbyville, Indiana

Purpose: Food and Drug officials, milk and food industry fieldmen and technicians, laboratory workers, sanitary engineers, research, teaching, agriculture and military personnel. To develop uniform and proper methods of food and milk supervision and inspection.

Publications: Journal of Milk and Food Technology, monthly.

INSTITUTE OF ENVIRONMENTAL SCIENCES, 34 South Main Street, Mt. Prospect, Illinois

Purpose: Engineers, scientists, and management personnel engaged in the simulation of natural environment and the environments induced by equipment operation (missiles, aircraft, etc.) and testing men, materials, and equipment in simulated environments. Professional activities are in areas of acceleration, humidity, radiation, high and low temperatures, fungus, altitude, sunshine, vibration, and various other areas.

Publications: IES Journal, bi-monthly; IES Proceedings, annually.

INSTITUTE OF LABORATORY ANIMAL RESOURCES of the National Science Foundation, 2101 Constitution Avenue, Washington, D. C. 20418

Purpose: To provide educational, informational communications and many other essential services to laboratories and individuals on a national and international basis, involved in research efforts utilizing laboratory animals.

Publications: ILAR News, quarterly.

INTERNATIONAL ASSOCIATION OF MICROBIOLOGICAL SOCIETIES,
Permanent Section of Microbiological Standardization,
Microstandards, Institute d'Hygiene, Geneva, Switzerland

Purpose: An office of the United Nations concerned with the determination and dissemination of knowledge concerned with the standardization of biologicals and related entities, including laboratory animals.

Publications: Symposia series in Immunological Standardization.

LABORATORY ANIMAL BREEDERS ASSOCIATION, Charles River Breeding
Laboratories, 1093 Beacon Street, Brookline, Massachusetts

Purpose: Breed animals especially for research. To promote and maintain ethical practices in production and marketing of laboratory animals; to aid in support of activities of animal diagnostic centers for the study and diagnosis of diseases of laboratory animals; to function as the agency for standardizing and improving methods and breeding techniques of laboratory animals and to accredit colonies.

Publications: Newsletter, quarterly.

LABORATORY ANIMAL SCIENCE ASSOCIATION, Dr. R. J. Ward, Canterbury
Biological Laboratories, Ltd., Ash, Canterbury, England

Purpose: To promote the interchange of scientific information among persons interested in Laboratory Animal Science, by means of meetings, lectures, educational training programs and publications.

Publication: Laboratory Animals, semi-monthly.

NATIONAL ASSOCIATION OF SANITARIANS, 1550 Lincoln Street, Denver, Colorado 80203

Purpose: Professional society of individuals engaged in environmental sanitation for governmental public health agencies, public health education, or inspection services for private employers. Seeks to standardize methods of law enforcement and general public health practices among governmental agencies.

Publications: Journal of Environmental Health, bi-monthly.

NATIONAL SOCIETY FOR MEDICAL RESEARCH, 111 Fourth Street, S.E., Rochester, Minnesota

Purpose: Associations, institutions and companies concerned with research in biology and medicine. Works to improve public understanding of the principles, methods and needs of biological and medical sciences.

Publications: Bio-Medical Purview, quarterly; Administration (Newsletter), monthly.

SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE, 630 West 168th Street, New York, New York

Purpose: Workers actively engaged in research in experimental biology or experimental medicine. To cultivate the experimental method of investigation in the sciences of biology and medicine.

Publication: Proceedings, 11 issues annually.

SOCIETY FOR INDUSTRIAL MICROBIOLOGY, 2000 P Street, N.W., Washington, D. C.

Purpose: Mycologists, bacteriologists, biologists, chemists, engineers, zoologists and others interested in biological processes as applied to industry.

Publications: Developments in Industrial Microbiology, annual; SIM Newsletter, quarterly.

UNITED STATES LIVESTOCK SANITARY ASSOCIATION, 33 Oak Lane, Trenton, New Jersey

Purpose: Veterinarians, livestock producers, transportation and livestock companies concerned with the improvement of the health of livestock and poultry through disease control and eradication.

Publications: Proceedings, annual.

APPENDIX E

CUMULATIVE LIST OF EDUCATIONAL INSTITUTIONS THAT SOUGHT INFORMATION REGARDING THE DELHI COLLEGE ANIMAL SCIENCE TECHNOLOGY PROGRAM, BY EITHER PERSONAL CAMPUS VISIT OR BY CORRESPONDENCE DURING THE YEARS 1965-1969

Division of Agriculture
Arizona State University
Tempe, Arizona

Department of Laboratory Animal Medicine
University of Arkansas
Medical Center
Little Rock, Arkansas

*California State Polytechnical College
San Luis Obispo
California

Technical and Industrial Education
Los Angeles Pierce College
6201 Winnetha Avenue
Woodland Hills, California 91364

Agriculture Department
Fullerton Junior College
Fullerton, California

*College of Agriculture
University of Florida
Gainesville, Florida

DeKalb Area Technical School
495 North Indian Creek Drive
Clarkston, Georgia 30021

Scientific Services Section
Laboratory Program
Public Health Service
National Communicable Disease Center
Atlanta, Georgia

College of Veterinary Medicine
University of Illinois
Urbana, Illinois 61803

Purdue University
School of Veterinary Science and Medicine
Lafayette, Indiana

American Animal Hospital Administration
3920 East Jackson Boulevard
Elkart, Indiana 46514

*Department of Veterinary Animal Science
College of Agriculture
University of Massachusetts
Stockbridge, Massachusetts

Essex Agricultural and Technical Institute
Hawthorne, Massachusetts

*Michigan State University
East Lansing, Michigan

College of Lay Assistants
Waseca, Minnesota

*School of Technical Agriculture
University of Nebraska
Curtis, Nebraska 69025

University of New Hampshire
Durham, New Hampshire

Bureau of Biological Research
Rutgers University
New Brunswick, New Jersey

*College of Health Related Professions
Downstate Medical School
State University of New York
Brooklyn, New York

Service Occupational Schools
100 Maple Place
Syosset, New York

New York City Office
State University of New York
60 East 42nd Street
New York, New York 10017

New York State Veterinary College
Cornell University
Ithaca, New York 14850

*State University of New York
Agricultural and Technical College
Farmingdale, New York 11735

Animal Welfare Institute
22 West 17th Street
New York, New York

*Department of Community Colleges
Agricultural and Technical Education
State Board of Education
Raleigh, North Carolina

Vocational-Technical Programs
Wilkes Community College
Wilkesboro, North Carolina

Pitt Technical Institute
Greenville
North Carolina

Stark Animal Hospital
3900 Cleveland Avenue, N.W.
Canton, Ohio

Agriculture Division
Penta-County Vocational School
Perrysburg, Ohio

*Department of Veterinary Science
Pennsylvania State University
University Park, Pennsylvania 16802

Agricultural Education Department
Bucks County Public Schools
Doylestown, Pennsylvania

Philadelphia High School of Agriculture and Horticulture
Henry Avenue, South of Shawmont Avenue
Philadelphia, Pennsylvania

Youth Activities Department
AQH Association
2736 West Tenth
Amarillo, Texas 79105

Department of Animal Science
School of Medicine
University of Washington
Seattle, Washington 98105

West Virginia Medical Society
200 - 5th Street, West
Huntington, West Virginia

Educational Services
National Society for Medical Research
1330 Massachusetts Avenue, N.W.
Washington, D. C. 20005

Department of Army
Walter Reed Institute of Research
Walter Reed Army Medical Center
Washington, D. C. 20012

Veterans Administration
Washington, D. C.

Animal Care Department
Graduate Studies and Research
McGill University
Montreal, Canada

Canadian Society for Animal Care
148 Belmont Avenue
Ottawa 1, Canada

Carworth, Europe
Huntingdon, England

Medical Research Council
National Institute of Medical Research
Mill Hill, London, N. W. 7
England

Osrodek Immunopatologll
Ciazy 1 Noworodka
Katowice, ul K. Swierczewskiego 15
Immunopathology Center of Pregnancy and Newborn
Katowice, Poland

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* Animal Science programs are currently being planned or in operation at these institutions.

APPENDIX F

COMPLETE BIBLIOGRAPHY FOR THE ANIMAL SCIENCE TECHNOLOGY PROGRAM

Abbott, A. and C. Lake *Protection Against Radiation.* Springfield, Illinois: Charles C. Thomas Publisher, 1961.

Abraminoff, P. *Laboratory Studies in Animal Biology.* San Francisco: W. H. Freeman & Co., 1966.

Adams, Ora R. *Lameness in Horses.* Philadelphia: Lea and Febiger, 2nd ed., 1966.

Allport, G. W. *The Individual and His Religion.* New York: Macmillan Co., 1950.

Allport, G. W. *The Nature of Prejudices.* Massachusetts: Wesley Publishing Co., 1954.

American Association for Laboratory Animal Science *Manual for Laboratory Animal Technicians.* Joliet: Same as author, 1967.

American Association for Laboratory Animal Science *Journal of Laboratory Animal Care.* Joliet: Same as author, quarterly.

American Institute of Biological Sciences *Developments in Industrial Microbiology.* Washington, D. C: Same as author, 1967.

American Institute of Biological Sciences *Style Manual for Biological Journals.* Washington, D. C: Same as author, 1964.

American Meat Institute Foundation *The Science of Meat and Meat Products.* San Francisco: W. H. Freeman & Co., 1960.

American Public Health Association Standard Methods of Applied Microbiology. New York: Same as author, 1948.

American Public Health Association Standard Methods for the Examination of Water and Waste Water. New York: Same as author, 1905.

American Veterinary Medical Association Principles of Veterinary Medical Ethics. Chicago: Same as author, 1969.

American Veterinary Medical Association American Veterinary Medical Association Directory. Chicago: Same as author, 1966.

American Veterinary Publications Large and Small Reference Library. Chicago: Same as author, 10 volumes, 1965.

American Veterinary Publications Equine Medicine and Surgery. Chicago: Same as author, 1963.

American Veterinary Publications Diseases of Cattle. Evanston, Illinois: Same as author, 1956.

American Veterinary Publications The Best of R.M.I. Chicago: Same as author, 1967.

American Welfare Institute Basic Care of Experimental Animals. New York: Same as author, 1970.

Andrew W. Comparative Hematology. New York: Grune and Stratton, 1965.

Annis, John An Atlas of Canine Surgery. Philadelphia: Lea and Febiger, 1967.

Anthony, C. P. Textbook of Anatomy and Physiology. St. Louis: C. V. Mosby Co., 7th ed., 1967.

Archer, R. K. Haematological Techniques for Use on Animals. London: Davis (Blackwell), 1965.

Archibold, J. Canine Surgery. Chicago: American Veterinary Publications, 1966.

Armed Forces Institute of Pathology Manual of Histologic Special Staining Procedures. Hightstown, New Jersey: McGraw-Hill Book Co., Inc., 1960.

Armrod, A. Surgery of the Dog and Cat Practice Guide. London: Barllier, 1966.

Arthur, D. R. Man and His Environment. New York: American Elsevier Publishing Co., 1969.

Asdell, Sydney Patterns of Mammalian Reproduction. Ithaca: Comstock Publishing Co., Inc., 1964.

Asimov, Isaac et al Stedman's Medical Dictionary. Baltimore: Williams and Wilkins Company, 1966.

Bacci, Guido Sex Determination. Long Island City: Pergamon Press, Inc., 1966.

Baer, Jean Comparative Anatomy of Vertebrates. London: Butterworths, 1964.

Bajusz, E. Methods and Achievements in Experimental Pathology. Chicago: Yearbook Medical Publishers, Inc., 1966.

Ballard, William Comparative Anatomy and Embryology. New York: The Ronald Press, no date.

Bavyon, N. Dairy Farmer's Veterinary Book. Springfield: Charles C. Thomas Publisher, 1963.

Belding, D. Basic Clinical Parasitology. New York: Appleton-Century-Crofts, 1964.

Benbrook, E. *Outline of Parasites Reported for Domesticated Animals in North America*. Ames: Iowa State University Press, 1963.

Benbrook, E. *Veterinary Clinical Parasitology*. Ames: Iowa State University Press, 1961.

Benajmin, M. *Outline of Clinical Veterinary Pathology*. Ames: Iowa State University Press, 2nd ed., 1961.

Benson, S. R. and P. Schiele *Tranquilizing and Anti-Depressive Drugs*. Springfield: Charles C. Thomas Publishers, 1962.

Benson, W. *Unusual Small Animals as Pets*. New York: Editors and Engineers, 1966.

Bernreiter, M. *Electrocardiography*. Philadelphia: J. B. Lippincott Co., 1963.

Biester, H. *Diseases of Poultry*. Ames: Iowa State University Press, 1965.

Blaker, A. *Photography for Scientific Publications*. San Francisco: W. H. Freeman & Co., 1965.

Blood, D. *Veterinary Medicine*. Baltimore: The Williams and Wilkins Co., 1963.

Blood, D. C. and J. A. Henderson. *Veterinary Medicine*. Baltimore: The Williams & Wilkins Co., 1960.

Bloom, F. *Pathology of the Dog and Cat*. Chicago: American Veterinary Publications, 1st ed., no date.

Bloom, F. *The Urine of the Dog and Cat*. New York: Gamma Publications, 1960.

Bock, K. *Shock: Pathogenesis and Therapy*. New York: Academic Press, 1962.

Boddie, G. *Diagnostic Methods in Veterinary Medicine*. Philadelphia: J. B. Lippincott Co., 1962.

Bollo, Louise E. *Introduction to Medicine and Medical Terminology*. Philadelphia: W. B. Saunders Co., 1961.

Booth, E. S. *Laboratory Anatomy of the Cat*. Dubuque, Iowa: Wm. C. Brown Co., no date.

Botar, J. *The Automotive Nervous System*. Budapest: Akademiai-Kiado, 1966.

Bourne, G. *The Biochemistry and Physiology of Bone*. Albany: Leonard Hospital Medical College, 1956.

Boyd, William *Pathology for the Physicians*. Philadelphia: Lea and Febiger, 1965.

Brackett, L. *Planned Breeding*. Chicago: Dog World, no date.

Brandly, P. J. G. Mizoki and K. Taylor *Meat Hygiene*. Philadelphia: Lea and Febiger, 1966.

Brandly, W. and E. Migak *Meat Hygiene*. Philadelphia: Lea and Febiger, 3rd ed., 1965.

Brandly, C. A. *Advances in Veterinary Science*. New York: Academic Press, 4 volumes, 1953, 1955, 1958, 1964.

Brauer, A. *Laboratory Directions for the Study of Histology*. Minneapolis: Brugess Publishing Co., 1955.

Brauer, A. *Laboratory Directions for Histological Techniques*. Minneapolis: Burgess Publishing Co., 1961.

Breed, R. S., E. C. Murray and N. R. Smith *Bargey's Manual of Determinative Bacteriology*. Baltimore: The Williams & Wilkins Co., 1957.

British Small Animal Veterinary Association *Animal Nursing*. Long Island City: Pergamon Press, Inc., 1966.

Brock *Milestones in Microbiology*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964.

Brooks, T. J., Jr. *Essentials of Medical Parasitology*. New York: The Macmillan Co., 1963.

Broom, W. and E. Selznik Sociology: *A Text with Adapted Readings*. New York: Harper and Row, 4th ed., no date.

Brown *Understanding Other Cultures*. Englewood Cliffs: Prentice-Hall, Inc., no date.

Brown, J. H. and S. B. Baker. *Basic Endocrinology*. Philadelphia: F. A. Davis Co., 1962.

Brown, J. *Basic Endocrinology for Students of Biology and Medicine*. Philadelphia: F. A. Davis Co., 1966.

Brown, H. W. *Basic Clinical Parasitology*. New York: The Macmillan Co., 1963.

Brown, R. L. *Pesticides in Clinical Practice.* Springfield: Charles C. Thomas Publisher, 1966.

Bruner, W. D. and J. H. Gillispie *Hagan's Infectious Diseases of Animals*. Ithaca: Comstock Publishing Co., Inc., 1966.

Buckett, M. *Introduction to Livestock Husbandry*. Long Island City: Pergamon Press, Inc., 1966.

Buckler, W. and A.Sklare *Essentials of Rhetoric*. New York: The Macmillan Co., 1966.

Burch, G. *Primer of Electrocardiography*. Philadelphia: Lea and Febiger, 1966.

Burns, M. Genetics of the Dog. Philadelphia: J. B. Lippincott Co., 1966

Burrell, P. Experimental Immunology. Minneapolis: Burgess Publishing Co., 1966.

Cahoon, J. B. Formulating X-ray Techniques. Durham: Duke University Press, 1966.

Cameron, T.W.M. The Parasites of Domestic Animals. Philadelphia: J. B. Lippincott Co., 1951.

Campbell, B. and R. Lasley The Science that Serves Mankind. New York: McGraw-Hill Book Co., 1969.

Campbell, R. Clinical Veterinarian Parasitism. Philadelphia: Lea and Febiger, 1966.

Campten and Harris Applied Animal Nutrition. New York: McGraw-Hill Book Co., 1969.

Carlson, W. Veterinary Radiology. Philadelphia: Lea and Febiger, 1966.

Carroll, P. How to Chart Data. New York: McGraw-Hill Book Co., 1960.

Carworth Farms Carworth Quarterly Letter. New York: Carworth Division of Becton, Dickinson & Co., quarterly.

Casarett, A. Radiation Biology. Englewood Cliffs: Prentice-Hall, Inc., 1968.

Catcott, E. J. et al Equine Medicine and Surgery. Chicago: American Veterinary Publications, 1963.

Catcott, E. J. Canine Medicine. Chicago: American Veterinary Publications, 1967.

Catcott, E. J. *Progress in Canine Practice*. Chicago: American Veterinary Publications, Part I, II and III, 1967.

Catcott, E. J. *Feline Medicine and Surgery*. Chicago: American Veterinary Publications, 1st ed., No date.

Catcott, E. J. *Progress in Feline Practice*. Chicago: American Veterinary Publications, 1966.

Catcott, E. J. *Progress in Equine Practice*. Chicago: American Veterinary Publications, 1966.

Chandler, A. *Introduction to Parasitology*. New York: John Wiley and Sons, 10th ed., 1964.

Charles River Breeding Laboratory *Charles River Digest*. Wilmington, Mass: Charles River Breeding Laboratories, Inc., quarterly.

Cheng, T. C. *The Biology of Animal Parasites*. Philadelphia: W. B. Saunders and Co., 1969.

Chiasson, R. B. *Laboratory Anatomy of the White Rat*. Dubuque, Iowa: Wm. C. Brown Co., no date.

Claus, E. *Pharmacognosy*. Philadelphia: Lea and Febiger, 1965.

Clegg, E. J. *The Study of Man*. New York: American Elsevier Publishing Co., 1968.

Coffin, D. L. *Manual of Veterinary Clinical Pathology*. Ithaca, New York: Comstock Publishing Assoc., 1953.

Cohrs, P. *Textbook of the Special Pathological Anatomy of Domestic Animals*. New York: Pergamon Publishing Co., No date.

Cole, H. *Introduction to Livestock Production*. San Francisco: W. H. Freeman & Co., 2nd ed., 1966.

Collier, P. *Crisis: A Contemporary Reader*. New York: Harcourt Brace & Co., 1969.

Collins, G. (AALAS) *Manual for Laboratory Animal Technicians*. Joliet, Illinois: American Association for Laboratory Animal Science, 1969.

Collins, V. *Principles of Anesthesiology*. Philadelphia: Lea and Febiger, 1966.

Collins, W. E. *Experience with Animal Technicians in Veterinary Pracitice*. Delhi, New York: Delhi College Publications, 1970.

Comant, R. and H. Robbins *What is Mathematics*? London, New York: Oxford University Press, 1941.

Conalty, M. L. *Husbandry of Laboratory Animals*. New York: Academic Press, 1967.

Cooney, D. *Thermophilic Fungi*. San Francisco: W. H. Freeman & Co., 1964.

Cooper, P. *Poisoning by Drugs and Chemicals*. Springfield: Charles C. Thomas Publisher, 1962.

Cornelius C. *Clinical Biochemistry of Domestic Animals*. New York; Academic Press, 1963.

Crampton, E. *Fundamentals of Nutrition*. San Francisco: W. H. Freeman & Co., 1959.

Crampton, E. *Applied Animal Nutrition*. San Francisco: W. H. Freeman & Co., 1956.

Crandall, L. *Management of Wild Animals in Captivity*. Chicago: University of Chicago Press, 1964.

Croft, P. *Introduction to the Anesthesia of Laboratory Animals.* New York: Animal Welfare Institute, 1967.

Cross, J. *New Standard Book of Dog Care and Training.* Chicago: Dog World, 1962.

Crouch, J. *Functional Human Anatomy.* Philadelphia: Lea and Febiger, 1965.

Cunningham, C. *A Laboratory Guide in Virology.* Minneapolis: Burgess Publishing Co., 1966.

Dacie, J. *Practical Haematology.* New York: Grune and Stratton, 1964.

Dale, S. *Principles of Steriod Analysis.* Philadelphia: Lea and Febiger, 1967.

Danial, R. S. *Contemporary Reading in General Psychology.* Boston: Houghton-Mifflin, 1965.

Daniel, L. *Laboratory Experiments in Biochemistry.* New York: Academic Press, 1967.

D'Amour, F. E., F. R. Flood and D. A. Belden, Jr. *Manual for Laboratory Work in Mammalian Physiology.* Chicago and London: University of Chicago Press, 1965.

Darmady, E. *Hematological Techniques.* New York: Grune and Stratton, 1963.

Davenport *Histological and Histochemical Techniques.* Philadelphia: W. B. Saunders and Co., 1966.

Davis, A. The Specificity of Cell Surfaces. Englewood Cliffs, N. J; Prentice-Hall, Inc., 1967.

Davis, H. *The Modern Dog Encyclopedia.* Chicago: Dog World, 1966.

Dawes, B. Advances in Parasitology. New York: Academic Press, Vol. 1, no date.

Delory, G. Photoelectric - Colorimetry in Clinical Biochemistry. New York: Hilger and Watts, Ltd., 1966.

Denhardt, R. A Story of Two Centuries. Norman: University of Oklahoma Press, 1967.

Denlinger, M. The New Complete Saint Bernard. New York: Howell Book House, 1967.

Dobzhansey, T. Heredity and the Nature of Man. New York: Signet Publishing Co., 1964.

Dougherty, E. Physiology of Digestion in the Ruminant. London: Butterworths, 1965.

Douglas, S. Principles of Veterinary Radiography. Baltimore: The Williams and Wilkins Co., 1963.

Drury and Wallington Carleton's Histological Technique. Fair Lawn, N.J: Oxford University Press, Inc., 1967.

Dukes, H. Physiology of Domestic Animals. Ithaca, N.Y: Comstock Publishing Co., Inc., 1967.

Dunn, H. W. Diseases of Swine. Ames: Iowa State University Press, 1964.

DuShane, G. Experiments in General Biology. San Francisco: W. H. Freeman & Co., 1950.

Dykstra Animal Sanitation and Disease Control. Danville, Ill: Interstate Printers & Publishers, Inc., 1955.

Eastham, R. Clinical Haematology. Baltimore: The Williams and Wilkins Co., 1966.

Eastman Kodak Co. The Fundamentals of Radiology. Rochester: Eastman Kodak Co., 1960.

Easton, D. Mechanisms of Body Functions. Gainesville: Florida State University, 1963.

Eddy, S. and A. C. Hodson Taxonomic Keys to Common Animals of North Central States. Mineapolis: Burgess Publishing Co., 1967.

Ehlers, V. M. and E. W. Steel Municipal and Rural Sanitation Company. New York: McGraw-Hill Book Co., 1965.

Ellenberger, B. Atlas of Animal Anatomy for Artists. New York: Murray Printing Co., 1956.

Emmel, V. Laboratory Technique in Biology and Medicine. Baltimore: Williams and Wilkins, 1964.

Emmons, C. Medical Mycology. Philadelphia: Lea and Febiger, 1963.

Ensminger, M. E. Animal Science. Danville, Illinois: Interstate Printers and Publishers, 1955.

Ensminger Horses and Horsemanship. Danville, Illinois: Interstate Printers and Publishers, 1965

Epstein, E. Skin Surgery. Philadelphia: Lea and Febiger, 1963.

Eulenberg, S. and B. Runko. Introductory Algebra: A College Approach. New York: Wiley, 2nd ed., 1966.

Evans, D. R. and A. J. Robertson Brain Physiology and Psychology. Berkeley: University of California Press, 1966.

Fairchild, L. Cats and All About Them. New York: Howell Book House, 1952.

Fairley, J. Essentials of Biological Chemistry. New York: Rheinhold Book Division, 2nd ed., 1966.

Farris, E. J. and J. Q. Griffith The Rat in Laboratory Investigation. New York: Hafner Publishing Co., 1963.

Farris, E. J. The Care and Breeding of Laboratory Animals. New York, London: John Wiley and Sons, Inc., 1960.

Farshler, E. Riding and Training. New York: Millers Publishing Co., 1959.

Faust, Beaver and Jung Animal Agents and Vectors of Human Disease. Philadelphia: Lea and Febiger, no date.

Fincher, M. Diseases of Cattle. Chicago: American Veterinary Publications, 1956.

Fitzgerald, R. J. and E. G. McDaniel Dental Calculus in the Germfree Rat. Archives of Oral Biology, 1960.

Fletcher, G. Textbook of Radio Therapy. Philadelphia: Lea and Febiger, 1966.

Florey, E. General and Comparative Anatomy. Philadelphia: W. B. Saunders Co., 1966.

Folk, E. Environmental Physiology. Philadelphia: Lea and Febiger, 1966.

Foster, H. L. The Care and Breeding of a Caesarean Derived Albino Rat Colony. Wilmington, Mass: The Charles River Breeding Laboratories, Inc., 1960.

Foust, H. Veterinary Histology and Embryology. Ames: Iowa State University Press, 1964.

Fox, M. W. Canine Pediatrics. Springfield: Charles C. Thomas Publisher, 1966.

Frandson, R. D. Anatomy and Physiology of Farm Animals. Philadelphia: Lea and Febiger, 1965.

Frank, E. R. Veterinary Surgery. Minneapolis: Burgess Publishing Co., 1965.

Fredette, V. Manual for the Classification and Determination of Anerobic Bacteria. Philadelphia: Lea and Febiger, 1966.

Frenay, S. Understanding Medical Terminology. Missouri: The Catholic Hospital Assoc., 1964.

Froissard, J. Equitation. Cranberry, New Jersey: Barnes, 1967.

Fuchs, A. Principles of Radiographic Exposure and Processing. Springfield: C. C. Thomas, Publisher, 1964.

Galigher, A. Essentials of Practical Microtechnique. Philadelphia: Lea and Febiger, 1964.

Galton, D. Haematology and Blood Groups. Chicago: Academic Press, 1965.

Garrigus, W. P. Introductory Animal Science. Chicago: J. B. Lippincott Co., 1956.

Gay, W. Methods of Animal Experimentation. New York: Academic Press, 1965.

Geschickter, C. F. and A. Cannon Color Atlas of Pathology Volume III. Philadelphia: J. B. Lippincott Co., 1963.

Getty, R. Veterinary Anatomy. Minneapolis: Burgess Publishing Co., 1953.

Getty, R. Atlas for Applied Veterinary Anatomy. Ames: Iowa State University Press, 1964.

Gibbons, W. Bovine Medicine and Surgery. Chicago: American Veterinary Publications, 1970.

Gibbons, W. Clinical Diagnosis of Diseases of Large Animals. Philadelphia: Lea and Febiger, 1965.

Gilbert, S. Atlas of General Zoology. Minneapolis: Burgess Publishing Co., 1965.

Ginsberg, F. Manual of Operating Room Technology. Philadelphia: J. B. Lippincott Co., 1966.

Godall, D. Horses of the World. New York: The Macmillan Co., 1965.

Godall, D. Ponies. Cranberry, N.J: A. S. Barnes, 1967.

Goldberger, E. Primer and Water, Electrolyte and Acid-Base Syndrome. Philadelphia: Lea and Febiger, 1965.

Goldstein, L. The Control of Nuclear Activity. Englewood Cliffs, N.J: Prentice Hall, Inc., 1967.

Gordon, J. E. Control of Communicable Diseases in Man. New York: American Public Health Assoc., 1965.

Gordon, S. et al The American Economy Analysis and Policy. Indianapolis: D. C. Heath and Co., 1969.

Green, E. Biology of Laboratory Mouse. Hightstown: McGraw-Hill Book Co., 1967.

Gresham, G. and A. R. Jennings Introduction to Comparative Pathology. New York: Academic Press, 1962.

Grey, A. and J. Elliott Economic Issues and Policies. Boston: Houghton-Mifflin Co., 1965.

Griffin, J. The Pony Book. Garden City: Doubleday Co., 1965.

Griffith, R. How to Live with a Horse. Cranberry, N. J: A. S. Barnes, 1967.

Grollman, A. Pharmacology and Therapeutics. Philadelphia: Lea and Febiger, 1967.

Grollman, S. Laboratory Manual of Mammalian Anatomy and Physiology. New York: The MacMillan Co., 1964.

Grunsen, W. Animal Health and Production. London: Butterworths, 1962.

Gumaer, K. I. Diseases of Laboratory Animals. (Publishing information incomplete)

Guth, H. Literature. Belmont, California: Wadsworth Publishing Co., 2nd ed., 1968.

Guth, H. P. A Short New Rhetoric. Belmont, California: Wadsworth Publishing Co., 1964.

Haberman, R. T. and F. P. Williams The Identification and Control of Helminths in Laboratory Animals. Maryland: Journal of National Cancer Institute, Vol. 20 #5, 1958.

Hafez, E. The Behavior of Domestic Animals. Baltimore: Williams and Wilkins Co., 1962.

Hafez, E. Adaptation of Domestic Animals. Philadelphia: Lea and Febiger, 1968.

Hafez, E. Reproduction in Farm Animals. Philadelphia: Lea and Febiger, 1968.

Hagan, W. A. and D. W. Bruner The Infectious Diseases of Domestic Animals. Ithaca, New York: Comstock Publishing Co., 1965.

Hahan, Selected Papers in Virology. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964.

Haines, F. Appaloosa: Spotted Horse in Art and History. Austin: University of Texas, 1963.

Hall, L. W. Wright's Veterinary Anesthesia and Analgesia. Baltimore: Williams and Wilkins Co., 1966.

Harding, G. Population, Evolution and Birth Control. San Francisco: W. H. Freeman and Co., 1969.

Harrigan, W. Laboratory Methods in Microbiology. New York: Academic Press, 1966.

Harris, R. Problems of Laboratory Animal Diseases. New York: Academic Press, 1962.

Harrison, E. S. and H. A. Strohmyer. Dairy Cattle Judging. New York: John Wiley and Sons, 1940.

Harrison, B. Dissection of the Cat. St. Louis: C. V. Mosby Publishing Co., 1966.

Hassan, W. Hospital Pharmacy. Philadelphia: Lea and Febiger, 1967.

Haw, P. B., B. L. Oser and W. H. Summerson Practical Physiological Chemistry. New York: McGraw-Hill Book Co., 1954.

Hayashi, T. Molecular Architecture in Cell Physiology. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1966.

Hedgecock, L. Antimicrobial Agents. Philadelphia: Lea and Febiger, 1967.

Hered W. and Mebergall Laboratory Manual - Basic Laboratory Studies in College Chemistry. Indianapolis: Raytheon Education Co., 1968.

Herrick, T. Evaluation of Fertility in the Bull and Boar. Ames: Iowa State University Press, 1962.

Hickey, J. A Comparison of Current Types of Germ Free Apparatus. Indiana: University of Notre Dame, 1959.

Hieger, I. Carcinogenesis. New York: Academic Press, 1961.

Hilgard, E. and R. Atkinson Introduction to Psychology. New York: Harcourt, Brace and World, 4th ed., no date.

Hirschhorn, R. Handbook of Practical Urology. Philadelphia: Lea and Febiger, 1965.

Histacount Corporation Histacount Key Master Bookkeeping System - Veterinarian's Edition. Melville, L.I., N.Y: Histacount Corporation, 1969.

Hoar, W. General and Comparative Physiology. Englewood Cliffs, N. J: Prentice-Hall, Inc., 1966.

Hodges, J. Harbrace College Handbook. New York: Harvest Books Imprint of Harcourt, Brace Journovich, Inc., 1967.

Hoerr, N. L. and A. Osol Blakiston's New Gould Medical Dictionary. Philadelphia: Blakiston Company, 1949.

Hoffman, T. The Cellular Functions of Membrane. Englewood Cliffs, N. J: Prentice-Hall, Inc., 1964.

Holmes, T. Obedience Training for Dogs. Levittown, L.I., N.Y: Transatlantic Arts, 1967.

Horton, R. E. and J. L. Hickey Irradiated Diets for Rearing Germfree Guinea Pigs. Joliet, Ill: Proceedings of the Animal Care Panel, 1961.

Hubbell, G. S. Writing Term Papers and Reports. New York: College Outline Series, Barnes and Noble, Inc., 1967.

Hull, T. F. Diseases Transmitted from Animal to Man. Springfield: C. C. Thomas, Publisher, 1963.

Humason, Animal Tissue Technique. San Francisco: W. H. Freeman and Co., 1962.

Hungate, R. The Rumen and Its Microbes. New York: Academic Press, 1966.

Hutt, F. B. Animal Genetics. New York: Ronald Press, 1964.

Ibsen Doll's House. New York: Washington Square Press, Inc., 1968.

Innes, J. Comparative Neuropathology. New York: Academic Press, 1962.

Institute of Laboratory Animal Resources Standards for the Breeding, Care and Management of Mice, Rats, Guinea Pigs, Rabbits, Hamsters, Dogs, Cats and Monkeys. Washington, D. C: Institute of Laboratory Animal Resources, 1967.

Institute of Laboratory Animal Resources Laboratory Animals. National Academy of Science; National Research Council, No Date.

Institute of Laboratory Animal Resources Standards for the Breeding and Care of Laboratory Primates. Washington, D. C: Institute of Laboratory Animal Resources, 1967.

Jacobs, M. Dictionary of Microbiology. New York: VanNostrand, 1957.

James, G. and R. C. James Mathematical Dictionary. (Incomplete)

James, W. The Varieties of Religious Experience. New York: Collier Books Imprint of MacMillan Co., No date.

Jennings, T. Feeding, Digestion and Assimilation in Animals. Long Island City: Pergamon Press, 1966.

Jensen, R. Diseases of Feedlot Cattle. Philadelphia: Lea and Febiger, 1965.

Johnsgard, P. Handbook of Waterfowl Behavior. Ithaca, N.Y: Comstock Publishing Co., Inc., 1965.

Johnson, E. W. Contemporary American Thought. New York: Free Press, 1968.

Jones, A. Microtechnique: A Student's Guide to Slide Making. Minneapolis: Burgess Publishing Co., 1967.

Jones, A. F. The Treasury of Dogs. New York Golden Press, 1964.

Jones, B. V. Animal Nursing, Part I. New York: Pergamon Press, Inc., 1966.

Jones, B. V. Animal Nursing, Part II. New York: Pergamon Press, Inc., 1966.

Jones, M. Veterinary Pharmacology and Therapeutics. Ames: Iowa State University Press, 1965.

Jones, R. M. Basic Microscopie Technique. Chicago: University of Chicago Press, 1966.

Jones, T. Veterinary Necropsy Procedures. Philadelphia: J. B. Lippincott Co., 1959.

Jubb, K.V.F. and P. C. Kennedy Pathology of Domestic Animals. New York: Academic Press, 1963.

Jube, A. C. Cat Genetics. New York: Crown Publishing Co., 1955.

Kammlade, W. G. Sheep Science. Chicago: J. B. Lippincott Co., 1947.

Kalant, O. T. The Amphetamines. Springfield: Charles C. Thomas Publisher, 1966.

Kays, D. T. The Horse. Cranberry, N. J: A. S. Barnes, 1953.

Kearley, B. L. You and Your Horse. Cranberry, N. J: A. S. Barnes, 1967.

Keeton, W. Elements of Biological Science. New York: Norton Publishing Co., 1969.

Keeton, W. Laboratory Guide for Biological Science. New York: Norton Publishing Co., 1969.

King and Caldwell General Chemistry. New York: American Book Co., 1967.

King, R. Genetics. Fair Lawn, N. J: Oxford University Press, 1965.

Kingsbury, J. Poisonous Plants of the United States and Canada. Englewood Cliffs, N. J: Prentice-Hall, Inc., 1964.

Kirk, R. Current Veterinary Therapy. Philadelphia: W. B. Saunders Co., 1966-67.

Kral, S. Veterinary and Comparative Dermatology. Philadelphia: J. B. Lippincott Co., 1964.

Kulesza, S. Modern Riding. Cranberry, N. J: A. S. Barnes, 1966.

Kuspira, T. Genetics Laboratory Exercises. Dubuque, Iowa: Wm. C. Brown Co., 1962.

Kytle, R. Clear Thinking for Composition. New York: Random House, 1969.

Lane-Petter, W. The U.F.A.W. Handbook on the Care and Management of Laboratory Animals. London: U.F.A.W., 1957.

Lane-Petter, W. Provisions of Laboratory Animals for Research. London-New York: Elsevier Publishing Co., 1961.

Lane-Petter, W. Animals for Research. New York: Academic Press, 1963.

Lasley, T. Genetics of Livestock Improvement. Englewood Cliffs, N. J: Prentice-Hall, Inc., 1963.

Lawson, C. A. Laboratory Studies in Biology. San Francisco: W. H. Freeman & Co., 1955.

Lazarus, N. E. Quality Control of Market Milk. Milwaukee: Olsen Publishing Co., 1960.

Leahy, J. Restraint of Animals. Ithaca, N.Y: Cornell Campus Store, 1953.

Leavell, B. S. and O.A.M. Thorup Fundamentals of Clinical Hematology. Philadelphia-London: W. B. Saunders Co., 1966.

Leavenson, S. N. et al. A Plastic Isolator for Operating in Sterile Environment. Surgical Forum, 1960.

Leonard, E. Fundamentals of Small Animal Surgery. Philadelphia: W. B. Saunders & Co., 1968.

Lerner, M. Modern Developments in Breeding. New York: Academic Press, 1966.

Levensen, S. Wound Healing. Washington, D. C: National Academy of Sciences, 1966.

Liener, I. Organic and Biological Chemistry. New York: Ronald Press, 1966.

Lillie, T. Histopathologic Technic and Practical Histochemistry. Hightstown: McGraw-Hill Book Co., 1966.

Lockley, D. Animal Navigation. New York: Hart Publishing Co., 1967.

Lorenz, C. King Solomon's Ring. New York: Crowell Collier & Macmillan Co., no date.

Luchey, T. Germ Life to Gnotobiology. New York: Academic Press, 1963.

Lumb, W. Small Animal Anesthesia. Philadelphia: Lea and Febiger, 1963.

MacFarlane, R. G. Functions of the Blood. New York: Academic Press, 1961

Macinnis, A. J. and M. Voge Experiments and Techniques in Parasitology. San Francisco: W. H. Freeman & Co., 1970.

Magrane, W. Canine Opthalmology. Philadelphia: Lea and Febiger, 1965.

Mahanta, K. Veterinary Microbiology. New York: Asia Publishing House, 1966.

Major, J. The Reach for Self. New York: Macmillan Co., 1969.

Maramosch, K. Methods in Virology. New York: Academic Press, 1967.

Marsh, H. Sheep Diseases. Baltimore: The Williams & Wilkins Co., 1958.

Mason, M. Bibliography of the Dog. Ames: Iowa State University Press, 1959.

Mayer, K. Canine Surgery. California: American Veterinary Publishers Co., 1957.

Mayer, W. Mammalian Populations, Vol. I and II. New York: Academic Press, 1963.

Maynard and Lossi *Animal Nutrition*. New York: McGraw-Hill Book Co., 1962.

McCay, C. M. *Nutrition of the Dog*. Ithaca, N. Y: Comstock Publishing Co., Inc., 1949.

McCay, C. M. *Meat Identification Kit*. Danville, Ill: The Interstate Printers & Publishers, Inc., 1966.

McKinney, F. *Psychology in Action*. New York: Macmillan Co., no date.

McLeod, W. M. *Bovine Anatomy*. Minnesota: Burgess Publishing Co., 1958.

Merchant, I. A. *Outline of Infectious Diseases of Domestic Animals*. Ames: Iowa State University Press, 1964.

Merchant, I. A. *Handbook of Cell and Organ Culture*. Minneapolis: Burgess Publishing Co., 1967.

Merchant, J. *Veterinary Bacteriology and Virology*. Ames: Iowa State University Press, 1961.

Merck and Company. *Merck Veterinary Manual*. Rahway, N. J: Merck & Co., Inc., 1965.

Metcalf, D. *The Thymus; Its Roles in Immune Responses*. New York: Springer-Verlag, 1966.

Miller, A. *All My Sons*. New York: Dell Publishing Co., 196 .

Miller, A. R. *Meat Hygiene*. Philadelphia: Lea and Febiger, 1958.

Miller, H. *The Common Sense Book of Kitten and Cat*. Wichita: Heartside Publishing Co., 1967.

Miller, M. *Anatomy of the Dog*. Philadelphia: W. B. Saunders Co., 1964.

Miller, M. E. Guide to the Dissection of the Dog. Ithaca, N. Y: Cornell University Press, 1970.

Miller, W. Encyclopedia of Animal Care. Baltimore: The Williams and Wilkins Co., 1964.

Mirand, E. A. Germ Free Biology: Experiments and Clinical Aspects. New York: Plenum Press, 1969.

Moses, C. Atherosclerosis. Philadelphia: Lea and Febiger, 1963.

Naegele, T. Advances in Acarology. Ithaca, N. Y: Comstock Publishing Co., Inc., 1965.

Nalbandov, A. V. Reproductive Physiology. San Francisco: W. H. Freeman & Co., 1964.

National Academy of Science Animals for Research. Washington, D. C: National Academy of Science, 196 .

National Academy of Science Animal Models for Bio-Medical Research. Washington, D.C: National Academy of Science, 1968.

National Academy of Science Laboratory Animals for Research. Washington, D. C: National Academy of Science, 1966.

National Academy of Science Laboratory Animals - Part II, Vol. 5. Washington, D. C: National Academy of Science, 1964.

National Academy of Science Laboratory Animals - Part I, IV and V. Washington, D. C: National Academy of Science, 1964.

National Academy of Science Non Human Primates. Washington. D. C: National Academy of Science, 1968.

National Academy of Science *Undergraduate Teaching in Animal Sciences*. Washington, D. C: National Academy of Science, 1967.

National Academy of Science *Users of Laboratory Animals in the United States*. Washington, D. C.: National Academy of Science, 1968.

National Geographic *Song and Garden Birds of North America*. Washington, D. C: National Geographic, 1967.

National Geographic *Wild Animals of North America*. Washington, D. C: National Geographic, 1963.

National Institutes of Health *Guide for Laboratory Animal Facilities and Care*. Washington, D. C: U. S. Department of Health, Education and Welfare (U. S. Government Printing Office), 1963.

National Naval Medical Center *Color Atlas of Pathology, Vol. I & II*. Philadelphia: J. B. Lippincott Co., 1956.

Netter, F. H. *The Ciba Collection of Medical Illustrations, Vol. I, II, III and IV*. Summit, N. J: Ciba Pharmaceutical Co., 1968.

New York Academy of Sciences *Germfree Vertebrates: Present Status.* New York: New York Academy of Sciences, 1959

New York State Department of Health *Public Health Law, Article 33A*. Albany: Same as author, no date.

New York State Department of Health *New York State Sanitary Code.* Albany: Same as author, no date.

New York State Department of Health *Administrative Rules and Regulations on Depressant and Stimulant Drug Control*. Albany: Same as author, no date.

New York State Veterinary Medical Society An Act to Amend the Education Law Relative to Certification of Animal Technicians. Utica: Same as author, 1969.

Nichols, V. Show Your Own Dog. New York: Crown Publishing Co., 1966.

Nieberle, K. Textbook of Special Pathological Anatomy of Domestic Animals. Long Island City: Pergamon Press, 1966.

Notre Dame University Proceedings of the Second Symposium on Gnotobiotic Technology. South Bend, Ind: Notre Dame University Press, 1960.

Nunokawn, W. D. Human Values and Abnormal Behavior. Chicago: Scott, Foresman & Co., 1965.

Nye, N. The Complete Book of the Quarter Horse. Cranberry, N. Y: A. S. Barnes, 1966.

Olmstead, E. Mammalian Cell Water. Philadelphia: Lea and Febiger, 1966.

Olsen, O. W. Animal Parasites - Their Biology and Life Cycles. New York: British Publishing House, 1962.

Onstott, K. The New Art of Breeding Better Dogs. New York: Howell Book House, 1962.

Ormond, A. N. Surgery of the Dog and Cat. Baltimore: The Williams and Wilkins Co., 1966.

Ouellette, R. J. Introductory Chemistry. New York: Harper College Books, Imprint of Harper & Row Publishers, Inc.. no date.

Palmer, A. C. Introduction to Animal Neurology. Philadelphia: F. A. Davis, 1965.

Parlorski, E. Natural Nidality of Transmissible Diseases. Urbana: University of Illinois Press, 1966.

Patten, J. W. The Light Horse Breeds. Cranberry, N. J: A. S. Barnes, 1960.

Patten, T. The Light Horse Breeds. Plant City, Florida: Kimbel, Publishers, 1966.

Pelczar, R. Microbiology. Hightstown: McGraw-Hill Book Co., 1965.

Pennack, R. W. Collegiate Dictionary of Zoology. New York: Ronald Press, 1964.

Perez, J. et al General Psychology. New York: Van Nostrand - Reinhold Publishing Co., 1967.

Perkin, C. The Pinto Horse. New York: Devin Publishers, 1960.

Perkins, T. Principles and Methods of Sterilization in Health Sciences. Springfield: Charles C. Thomas Publisher, 1965.

Peters, J. A. Classic Papers in Genetics. Englewood Cliffs, N. J: Prentice-Hall, Inc., 1959

Pettit, G. Intervertebral Disc Protrusion in the Dog. New York: Appleton-Century-Crofts, 1966.

Pettus, S. Laboratory Manual for Introductory Zoology. Minneapolis: Burgess Publishing Co., 1968.

Pfaffenberger, C. The New Knowledge of Dog Behavior. New York: Howell Book House, 1963.

Podhajsky, A. The Complete Training of Horse and Rider. Garden City: Doubleday Co., 1967.

Porter, K. Introduction to Fine Structure of Cells and Tissues. Philadelphia: Lea and Febiger, 1965.

Preece, A. Manual for Histologic Technicians. Boston: Little, Brown & Co., 1965.

Prier, J. Basic Medical Virology. Baltimore: The Williams & Wilkins Co., 1966.

Prosser, C. L. and F. A. Brown Comparative Animal Physiology. Philadelphia: W. B. Saunders Co., 1962.

Quick, A. Hemorrhagic Diseases and Thrombosis. Philadelphia: Lea and Febiger, 1966.

Quimby, S. and J. Feitelberg Radioactive Isotopes in Medicine and Biology. Philadelphia: Lea and Febiger, 1963.

Ranson, S. W. The Anatomy of the Nervous System. Philadelphia: W. B. Saunders Co., 1957.

Reyniers, J. A. Germfree Life Studies - Lobund Report #1. South Bend, Ind: Notre Dame University Press, no date.

Reyniers, T. Annals of New York Academy of Science, Vol. 78, Article I. New York: New York Academy of Science, 1959.

Ribelin, W. Pathology of Laboratory Animals. Springfield: Charles C. Thomas Publisher, 1965.

Ricci, A. T. Understanding and Training Horses. Philadelphia: J. B. Lippincott Co., 1964.

Ricketts, V. All About Toy Dogs. New York: Howell Book House; 1965.

Riley, W. F. Yearbook of Veterinary Medicine, Vol. 1 and 3. Chicago: Yearbook Medical Publishers, Inc., 1965.

Rohrberger, M. et al An Introduction to Literature. New York: Random House, 2nd ed., 1968.

Root, S. and J. Hoffman Physiological Pharmacology. New York: Academic Press, 1963.

Rose, C. W. Agricultural Physics. Long Island City: Pergamon Press, Inc., 1966.

Rugh, Robert Experimental Embryology Techniques and Procedures. Minneapolis: Burgess Publishing Co., 1962.

Runnells, R. A., W. S. Monlux and A. W. Munlux Principles of Veterinary Pathology. Ames: Iowa State University Press, no date.

Russell, W. M. Principles of Humane Experimental Technique. Springfield: Charles C. Thomas Publisher, 1967.

Salisbury, G. W. Physiology of Reproduction and Artificial Insemination of Cattle. San Francisco: W. H. Freeman & Co., 1961.

Samuelson, P., R. L. Bishop and J. R. Coleman Readings in Economics. McGraw-Hill Book Co., 1964.

Sanborn, W. R. Immunofluorescence. Frederick, Md: Fort Detrick, 1965.

Saunders, B. The Complete Book of Dog Obedience. New York: Howell Book House, 1966.

Schalm, A. Veterinary Hematology. Philadelphia: Lea and Febiger, 1965.

Schermer, S. Blood Morphology of Laboratory Animals. Philadelphia: F. A. Davis, 1967.

Schipper, I. A. Lecture Outline of Preventive Veterinary Medicine for Animal Science Students. Minneapolis: Burgess Publishing Co., 1962.

Schlough, T. A Guide to the Dissection of the Mink. Wisconsin: NASCO., 1968.

Schmidt-Nielson, K. Animal Physiology. Englewood Cliffs, N. J: Prentice-Hall, Inc., 1962

Schneider, S. and R. Walker The Range of Literature. New York: American Book Co., 2nd ed., 1967.

Schrier, A. M. Behavior of Non Human Primates. New York: Academic Press, 1965.

Schwartz, S. O. Hematology in Practice. Hightstown: McGraw-Hill Book Co., 1961.

Scientific American The Living Cell. San Francisco: W. H. Freeman & Co., 1965.

Seeley, H. W. and P. T. Vandermark Microbes in Action. San Francisco: W. H. Freeman & Co., 1965.

Seiden, R. Livestock Health Encyclopedia. New York: Springer Publishing Co., Inc., 1961.

Seiden, R. Veterinary Drugs in Current Use. New York: Springer Publishing Co., Inc., 1966.

Seiden, R. Insect Pests of Livestock, Poultry and Pets. New York: Springer Publishing Co., Inc., 1966.

Seiden, R. The Handbook of Feedstuffs. New York: Springer Publishing Co., Inc., 1957.

Seiverd, C. E. Hematology for Medical Technologists. Philadelphia: Lea & Febiger, 1964.

Self, M. C. The Horseman's Encyclopedia. Cranberry, N. J: A. S. Barnes, 1963.

Self, M. C. Horsemastership. Cranberry, N. J: A. S. Barnes, 1952.

Selkurt, E. E. Physiology. Boston: Little, Brown, & Co., 1966.

Selwood Chemical Principles. New York: Holt, Rinehart & Winston, Inc., no date.

Selwood General Chemistry. New York: Holt, Rinehart & Winston, Inc., no date.

Short, D. J. A.T.A. Manual of Laboratory Animal Practice. Springfield, Ill: Charles C. Thomas Publisher, 1966.

Sikes, L. N. Using the American Quarter Horse. Saddle Rock, N. J: 1958.

Silvan, J. Raising Laboratory Animals. Grove City, N.Y: Natural Hist. Press., 1966.

Silver, S. Radioactive Isotopes in Medicine and Biology. Philadelphia: Lea and Febiger, 1962

Singleton, W. R. Elementary Genetics. Princeton, N. J: D. Van Nostrand, Inc., 1964.

Sirridge, M. S. Laboratory Evaluation of Hemostasis. Philadelphia: Lea & Febiger, 1969.

Smalley, B. Working with Horses. Plant City, Florida: Kimble Publishing Co., 1963.

Smith, K. M. Advances in Virus Research. New York: Academic Press, 1966.

Smith, R. H. Electrical Anesthesia. Springfield, Ill: Charles C. Thomas Publisher, 1963.

Smith, R. W. Technical Writing. New York: Barnes & Noble, Inc., 1965.

Smith, W. Mechanisms of Virus Infection. New York: Academic Press, 1963.

Smith and Jones Veterinary Pathology. Philadelphia: Lea and Febiger, 1961.

Smith-Painter Guide to Literature of Zoological Science. Minneapolis: Burgess Publishing Co., 1968.

Smithcors, J. F. American Veterinary Profession. Ames: Iowa State University Press, 1963.

Smithcors, J. F. Progress in Swine Practice. Chicago: American Veterinary Publications, 1966.

Smitheors, J. A. and E. J. Catcott Progress in Veterinary Practice - Questions and Answers. Chicago: American Veterinary Publications, 1968.

Smythe, R. H. Animal Talk. Springfield, Ill: Charles C. Thomas Publisher, 1961

Smythe, R. H. Animal Vision. Springfield, Ill: Charles C. Thomas Publisher, 1961.

Smythe, R. H. Horses in Action. Springfield, Ill: Charles C. Thomas Publisher, 1964.

Snyder, L. H. and P. R. Davis The Principles of Heredity. Indianapolis: D. C. Heath & Co., 1957.

Sports Illustrated Sports Illustrated Book of Dog Training. Chicago: J. B. Lippincott Co., 1960.

Soulsby, E.J.L. Helminths, Arthropods and Protozoa of Domestic Animals, 6th ed. Baltimore: The Williams & Wilkins Co., 1968.

Srb, A. M., R. D. Owen and R. S. Edgar General Genetics. San Francisco: W. H. Freeman & Co., 1965.

Stainer The Microbial World. New York Van Nostrand-Reinhold Publishing Co., no date.

Stanton, I. A. *Dictionary for Medical Secretaries*. Springfield, Ill: Charles C. Thomas Publisher, 1960.

State University - Arizona *Stud Manager's Handbook, Vol. I*. Tucson: Arizona State University Press, 1967.

Statland, H. *Fluid and Electrolytes in Practice*. Chicago: J. B. Lippincott Co., 1963.

Stebbins, L. *Processes of Organic Evolution*. New York: Prentice-Hall, Inc., 1966.

Steele, H. C. *The Departmental Laboratory Assistant in Biological Science*. Philadelphia: Dorrance & Co., 1967.

Stott, F. V. *Instruments in Clinical Medicine*. Philadelphia: F. A. Davis Co., 1967.

Strehler, B. L. *Time, Cells and Aging*. New York: Academic Press, 1962.

Sturgis, C. C. *Hematology*. Springfield, ILL: Charles C. Thomas Publisher, 1955

Sutherland, S. *When You Preside*. Cincinnati: Farm Book Store, 1967.

Taylor, J. A. *Regional and Applied Anatomy of Domestic Animals, Part 1 and 2*. Chicago: J. B. Lippincott Co., 1955, 1959.

Teach, B. A. *Bibliography of Germ Free Animals*. South Bend, Ind: Notre Dame University Press, 1964, 1965.

Technicon Corp. *Automation in Analytical Chemistry*. Ardsley, N. Y: Same as author, 1967.

Tekland, Inc. *Physiological Data for Common Laboratory Animals.* Monmouth, Ill: Same as author, 1968.

Tepperman, J. Metabolic and Endocrine Physiology. Chicago: Yearbook Medical Publishers, Inc., 1966.

Thienes C. and T. Haley Clinical Toxicology. Philadelphia: Lea & Febiger, 1964.

Thompson, W. C. Irish Setter. New York: Howell Book House, 1967.

Truzzi Sociology and Everyday Life. Englewood Cliffs, N. J: Prentice-Hall, Inc., no date.

Turner, P. C. Technical Report Writing. New York: Holt, Rinehart & Winston, 1965.

Udall, D. The Practice of Veterinary Medicine. Ithaca, N.Y: published by the author, 1954.

United States Armed Forces Institute Manual of Histologic and Special Staining Procedures. Washington, D. C: Same as author, 1966.

United States Naval Medical School Color Atlas of Pathology Vol. I, II and III. Chicago: J. B. Lippincott Co., 1950, 1954, and 1963.

United States Public Health Service Ordinance and Code. Washington, D. C., no date.

University of Missouri (Extension Division) Handling Packaged Meat. Columbia: Same as author, no date.

Vander Hoeden, J. Zoonoses. New York: American Elsevier Publishing Co., 1964.

Vigran, M. Clinical Anticoagulant Therapy. Philadelphia: Lea & Febiger, 1965.

Walker, E. Studying Our Fellow Mammals. New York: Animal Welfare Institute, 1967.

Walker, W. F. Study of the Cat. Philadelphia: W. B. Saunders Co., 1967.

Warren, A. Comparative Hematology. New York: Grune & Stratton, 1965.

Warren, L. Pathology of Diabetes Mellitus. Philadelphia: Lea & Febiger, 1966.

Weber, R. Biochemistry of Animal Development. New York: Academic Press, 1965.

Wedberg, S. E. Introduction to Microbiology. New York: Reinhold Publishing Co., 1966.

Weiser Practical Food Microbiology. Westport, Ct: AVI Publishing Co., 1962.

Weisz, P. B. Elements of Zoology. New York: McGraw-Hill Book Co., 1968.

Weisz, P. B. Laboratory Manual - Elements of Zoology. New York: McGraw-Hill Book Co., 1968.

Wells, T.A.G. The Rat. New York: Doner Publishing Co., 1966.

Westhues, M. Animal Anesthesia, Vol. I and II. Chicago: J. B. Lippincott Co., 1964.

Wetmore, A. Water, Prey and Game Birds of North America. Washington, D. C: National Geographic, 1965.

White, M.J.D. The Chromosomes. Portland, Oregon: Wiley Leonard Publishing Co., 1950

White, J. M. Medical Education and Anesthesia. Philadelphia: F. A. Davis Co., 1966.

Whitlock, J. H. Diagnosis of Veterinary Parasitisms. Philadelphia: Lea & Febiger, 1960.

Whitney, L. F. Dog Psychology: The Basis of Dog Training. Springfield; Ill: Charles C. Thomas Publisher, 1964.

Whitney, L. F. Farm Veterinarian. Springfield, Ill: Charles C. Thomas Publisher, 1964.

Whitney, L. F. The Natural Method of Dog Training. Chicago: J. B. Lippincott Co., 1963.

Widmer, J. American Quarter Horse. New York: Scribner & Sons, 1959.

Widmer, J. Practical Guide for Horse Owners. New York: Scribner & Sons, 1957.

Wilkinson, G. T. Diseases of the Cat. New York: Pergamon Press, 1966.

Willeford, G. Medical Word Finders. New Jersey: Parker Publishing Co., 1969.

Williams, D. Immortal Poems of the English Language. New York: Washington Square Press, Inc., no date.

Wilner, B. I. A Classification of the Major Groups of Human and Other Animal Viruses. Minneapolis: Burgess Publishing Co., 1966.

Wilson, S. D. Applied and Experimental Microscopy. Minneapolis: Burgess Publishing Co., 1967.

Winchester, A. M. Genetics. Boston: Houghton-Mifflin Co., 1951.

Wing, J. M. Dairy Cattle Management. New York; Reinhold Publishing Co., 1963.

Winge, Ojvind *Inheritance in Dogs*. Ithaca, N. Y: Comstock Publishing Co., 1950.

Winsor and Hyman *A Primer of Peripheral Disease*. Philadelphia: Lea & Febiger, 1965.

Wintrobe, M. M. *Clinical Hematology*. Philadelphia: Lea & Febiger, 1967.

Wischnitzer, S. *Atlas and Dissection Guide for Comparative Anatomy*. San Francisco: W. H. Freeman & Co., 1967.

Wohl and Goodhart *Modern Nutrition in Health and Disease*. Philadelphia: Lea & Febiger, 1964

Wood, J. et al *Fundamentals of College Chemistry*. New York: Harper & Row, 1968.

World Association for the Advancement of Veterinary Parasitology *The Biology of Parasites*. New York: Academic Press, 1966.

Wrem, R. L. *Basic Contributions to Psychology*. Belmont, California: Brook-Cole Publishing Co., 1970.

Wright, G. *The Cavalry Manual of Horsemanship and Horsemastership*. Garden City, N. Y: Doubleday Co., 1966.

Wright, G. *Learning to Ride, Hunt and Show*. Garden City, N. Y: Doubleday Co., 1966.

Wright, J. G. *Wright's Veterinary Anaesthesia and Analgesia*. Baltimore: The Williams & Wilkins Co., 1966.

Yapp, W. B. *Vertebrates: Their Structure and Life*. Fair Lawn, N. J: Oxford University Press, 1965.

Yearbook Agriculture *Animal Diseases*. Washington, D. C: Government Printing Office, 1956.

Yoffey, J. M. Quantitative Cellular Hematology. Springfield, Ill: Charles C. Thomas Publisher, 1961

Young, W. C. Sex and Internal Secretions. Baltimore: The Williams & Wilkins Co., 1961.

Zoological Society of London International Zoo Yearbook. London: Zoological Society of London, no date.

Zinsser Microbiology. New York: Appleton-Century-Crofts, 1964.

Zuckerman, J. Diagnostic Examination of the Eye. Chicago: J. B. Lippincott Co., 1964.

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